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THE STATE OF THE STATES

1987

Energy Waste
Leaking Toxic Chemicals
Trash
Tree Damage
HIGH COSTS
Greenhouse Effect
PROPERTY DAMAGE
Acid Rain
WATER DEPLETION
Polluted Drinking Water
Smog
Litter
AIR POLLUTION
Vulnerable Lakes & Streams
EROSION
BIRTH DEFECTS
Toxic Fumes
RADIOACTIVE WASTE
Crop Damage
Groundwater Contamination
Pesticides

FUND FOR RENEWABLE ENERGY AND THE ENVIRONMENT

The Environmental Turning Point

Federal and state governments are now writing our environmental future. Important choices are being made about the risks and costs we and our children will face. Since 1981 the federal government has been steadily reducing its role in regulatory protection and shifting far greater responsibility to the states. While budgets have declined, problems have mounted. As a result we continue to risk public health and destroy our most important natural assets through air pollution, water degradation, soil erosion, and the generation of toxic wastes. But, fortunately, American support for a safe and healthy environment appears to be rising dramatically.

Americans attach unprecedented importance to a clean environment. A recent Harris survey found that 93 percent of the people believe that water pollution is a serious problem, 92 percent say the same about toxic wastes, and 79 percent are concerned about acid rain. Politicians are beginning to get the message, as shown by the successes of many pro-environment candidates and issues in the 1986 elections. A recent Hudson Institute study predicts that the baby boom generation (born between 1946 and 1954) "will favor legislators who seek to expand individual opportunities and environmental protection."

The current reality is that a budget deficit of $220 billion and increased defense spending have forced significant reductions in a number of effective and badly needed programs. Funding and attention given to air pollution programs has slackened, and even hazardous waste programs receive only enough support for limited action. States which in the past have relied heavily on federal support of their environmental protection efforts were badly gored by the budget cuts of the early eighties.

The country now faces increasing damage from water degradation, soil erosion and generation of toxic wastes. New environmental hazards whether they be pesticides in drinking water or toxic air pollution from waste incineration plants seem to appear every year. As a result, states that maintain static environmental programs are overwhelmed by rapidly growing problems or respond only after a catastrophe has struck.

The turning point which may halt this steady degradation is more than just a shift in voting patterns. In the past ten years, traditional concerns for conserving natural resources have been joined by a recognition of the need to protect public health, and more recently by the realization that sustained economic growth is dependent on protecting soil, water, air, and other natural resources. Because greater environmental responsibility has been shifting to the states, citizens can have a greater voice at the local level over what risks they are, or are not, willing to face.

One of the more pernicious effects of recent federal budget cuts is the increasing inequity of state funding options. It is essential that the federal government rededicate itself to environmental protection so that present economic disparities do not translate into larger environmental disasters in the future.

Good intentions are not enough. Economic problems and federal budget cuts mean that many states are faced with pressing needs in education, housing, and medical care, as well as the environment. All of these issues must be addressed. But because we don't have precise measures of the economic and social value of a secure environment, we sometimes underestimate its importance. If we continue to let essential environmental support systems deteriorate, everyone will suffer.

The Fund for Renewable Energy and the Environment has created *State of the States* as a means of calling attention to states that have effectively responded to mounting environmental problems. In the wide variety of programs introduced in the past few years, states have a great deal to learn from one another. No state is doing everything right and none is doing everything wrong, but all must begin taking more responsibility in shaping their own futures. The health of people and the environment and the strength of states' economies will depend on their ability to do so.

State of the States is the first in a planned series of annual reports that assess where the states stand on key environmental topics such as air pollution reduction, soil conservation, solid waste and recycling, hazardous waste management, groundwater protection, and renewable energy and conservation. It is not an empirical study of the environmental quality of the states but a subjective assessment of total program strengths. We hope with this report to develop an initial benchmark against which states can measure their progress. We also hope it will be a starting point for more comprehensive assessments of these and other environmental issues.

State of the States provides both a national overview of particular problems and a ranking of the states according to program strengths. The ranking takes into consideration the degree of soil erosion, groundwater consumption, or air pollution in a state and then evaluates the program response through selected indicators of legislation, enforcement, funding, and other considerations. While much innovation is taking place, out of necessity, only those elements that have been made into law, formal standards, or guidelines, are considered.

Investing in environmental protection means protecting the present and investing in the future. *State of the States* represents a beginning. The intent is to raise the priority of environmental issues at state and community levels. As the first in a planned series of reports, it is but one small contribution to governors, state legislators, city and county officials, and citizens in developing goals for our common fight to protect and efficiently utilize our natural resources. We hope that those out in the trenches will let us know if the report is useful and will make suggestions on how we can make it more effective in the years ahead.

Tina C. Hobson
Executive Director
Fund for Renewable Energy and
the Environment

The Fund for Renewable Energy and the Environment (FREE) was formed in August 1986, replacing the Solar Lobby and the Center for Renewable Resources. FREE's expanded mission will build upon the important work done by these two previous organizations and provide new tools to state and local decisionmakers to take action in their own behalf.

THE STATE OF THE STATES

By Scott Ridley

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EXECUTIVE SUMMARY

HIGH COSTS
Drinking Water
AIR POLLUTION

... There is a deepening realization of the high costs and tradeoffs.

The United States has reached a turning point in environmental progress. As costs for protection of public health and natural resources have risen in the past five years, the federal government has retreated from its traditional support. As a result, momentum on key issues has stalled and an increasing burden for environmental protection has been shifted to state and local governments. The question is whether states will have the resources to maintain and expand essential programs, and win the cooperation of industry to reduce waste and pollution. Current trends indicate deepening trouble ahead.

The last fifteen years have brought impressive progress in cleaning up the environment. The smog in many cities has receded. Rivers once fouled by chemicals and sewage are cleaner. Overburdened landfills have generated broad debate on recycling and alternative waste management. The discovery of contamination at thousands of hazardous waste dumps has spurred clean-up efforts and programs to protect groundwater. And renewable energy sources have pushed forward to supply nearly 10 percent of the nation's energy needs.

From the vantage point of 1970, a whirlwind of activity has swept through government and private industry to protect our health and natural resources. But the change has also brought expanded awareness of the serious public health and resource problems we face.

A glance at the headlines shows bright hopes for the environment are mixed with turbulent uncertainties. Each week seems to bring new revelations of leaking underground storage tanks, hazardous waste dumps, contaminated drinking water, controversy over landfills and garbage incineration plants, and threats of far-reaching climatic changes from air pollution.

Although hope remains strong, the facts and trends behind the news stories indicate deepening trouble. On many environmental issues, progress of the last decade has stalled. On other issues it has begun rolling backward. Air pollution, for example, is increasing once again and funding reductions for air programs threaten to cripple monitoring in some areas. After a hopeful start, hazardous waste cleanup has become mired in court suits, inadequate technology, and funding sufficient for only limited actions. Government support for renewable energy technologies and conservation has been slashed. Cutbacks in key soil conservation programs threaten to undermine efforts to save cropland. And federal assistance to help manage more than 150 million tons of garbage each year has been reduced to almost nothing.

Previously, the federal government assumed major responsibility for environmental programs. The 1970s were a time of expanding legislative and fiscal commitment to improve the nation's air, land and water. Pollution standards were set and tax money was earmarked for environmental cleanup. Backed by this support states initiated and expanded local projects.

In the early 1980s the situation began to turn around. The Omnibus Budget Reconciliation Act and the Economic Tax Recovery Act of 1981 set the federal government on the road to slashing many domestic programs. The federal grants-in-aid contribution to all such programs dropped nine percent as part of the total state budgets from 1981 to 1986, while spending on other areas such as national defense rose from $172.5 billion to $267.8 billion during the same period.

Funding for key air pollution reduction programs was frozen at about $95 million per year (a reduction of 24 percent in real value). Funding for key soil conservation programs was reduced from $365 million in 1981 to $348 million (in real value) in 1986. Funding for state solid waste programs was cut from $13 million in 1981 to zero in 1986. And federal appropriations for key state energy conservation programs were reduced from $802 million in 1981 to $427.5 million in 1986.

At the same time the federal government was making these cuts it began to shift increasing responsibilities to state governments under the philosophy of New Federalism. The result for most states has been a series of tough choices. Funding for environmental problems are often sacrificed to pay for important education, housing, and highway repair programs. Unless environmental threats are immediate and dramatic, action is frequently delayed, allowing public health dangers, long term environmental damage, and the ultimate cost for remedial action to increase. States with tight budgets are especially caught in this dilemma.

With full recognition of these trends and the difficulties state governments are facing, this report briefly examines the historical relationship between the federal government and the states, and provides an initial assessment of what has been accomplished in six environmental topics: air pollution reduction, soil conservation, groundwater protection, hazardous waste management, solid waste and recycling, and renewable energy and conservation. It is not intended to be a comprehensive assessment of environmental conditions in each state, but an accurate measure of key legislation and programs states have put in place to assure on-going protection of air, water and soil.

The facts show both the progress and difficulties ahead:

- **Air Pollution Reduction**—While thick black smoke no longer curls from the stacks of most industrial plants and pollution from automobiles and trucks has been reduced, progress in air pollution has reached a turn in the road. Funding for air pollution work in many states is being cut back and further progress may be restricted.

Nationwide, the real value of federal funding for air programs decreased by 24 percent between 1979 and 1984. As a result air monitors have been cut back by 29 percent of the states, only limited work is expected on acid rain, new toxic air pollution programs may not be initiated or fully implemented, and reduction targets for standard pollutants such as sulphur oxides, carbon monoxide, and ozone are not expected to be met.

The ten top states for air pollution reduction are: CA, CT, NJ, WI, MI, NC, OH, PA, VA, WA.

- **Soil Conservation**—Since the early 1970s the nation's farmland has been battered by weather, the economy, and political storms. According to the most recent reports, the amount of cropland needing erosion control has increased in 26 states since 1977, decreased in 21 states, and remained the same in 2 states. Soil related damage on farmlands is estimated to run between $2 billion and $13 billion annually. Federal incentives which have encouraged cultivation of highly erodible soils have hopefully been corrected by conservation reserve and "sodbuster" provisions included in the 1985 farm bill. But proposed funding cuts have raised doubts over the potential of these programs. Time will tell if the new soil conservation programs can counter economic pressures to maximize production and halt the trend toward increased erosion that began in the mid-1970s.

The top ten states for soil conservation are: IA, IL, DE, MD, OH, SD, WI, MI, NC, VA.

- **Groundwater Protection**—Because of the high visibility of water contamination from pesticides, hazardous waste dumps, and leaking underground storage tanks, half the states have initiated plans for groundwater protection. The US Geological Survey has mapped the primary aquifers across the country, and many states are moving to fill in the details on those maps. Federal legislation is expected in 1987 to provide guidelines for states to develop comprehensive groundwater programs. The choice may come down to setting a goal to require nondegradation of any groundwater supplies, or

Combined Ranking of State Programs

Rank	*State*	*Total Points (out of 60)*
1	Wisconsin	49
2	California	48
3	New Jersey	47
4	Connecticut	44
5	Michigan	43
	New York	43
7	North Carolina	42
8	Florida	41
	Illinois	41
	Massachusetts	41
11	Iowa	39
12	Minnesota	38
13	Maine	36
	Indiana	36
15	Oregon	35
16	Maryland	34
	Ohio	34
18	Virginia	33
19	New Hampshire	32
	Pennsylvania	32
21	Missouri	31
	Nebraska	31
	South Carolina	31
24	Rhode Island	30
25	Kansas	29
	Oklahoma	29
	Tennessee	29
	Washington	29
29	Kentucky	28
	Vermont	28
31	Arizona	27
32	Georgia	26
	Texas	26
34	Delaware	24
	Colorado	24
36	Montana	23
	Nevada	23
	New Mexico	23
	South Dakota	23
40	Louisiana	21
41	Hawaii	19
42	Alaska	18
	Arkansas	18
	Idaho	18
45	Alabama	16
	North Dakota	16
	Utah	16
	Wyoming	16
49	West Virginia	15
50	Mississippi	14

selecting which aquifers we will allow to become contaminated.

The top ten states in groundwater protection are: NY, CT, FL, KS, MA, MI, NM, NC, WI, WY.

- **Hazardous Waste Management**—The principal focus of hazardous waste activity has been the federal Superfund program. But between 1980 and 1986, only 13 sites were cleaned up and removed from the Superfund list. EPA's Emergency Response and Remedial Investigation System list contains some 22,000 sites needing attention, and the Office of Technology Assessment estimates that as many as 600,000 sites may eventually require remedial action. In response to the rapidly expanding number of hazardous waste sites needing action and the lethargy of the federal Superfund program, 29 states have put their own Superfund provisions in place. Because states have only limited funding, the key to reducing health threats from hazardous waste appears to rest with how much responsibility industry is willing to take for cleanup and waste reduction. Another emerging element that may spark action is citizen "right-to-know" provisions in hazardous materials law which entitle citizens to know what chemicals are being stored, manufactured, dumped, or processed in their communities.

Nine states with the most comprehensive hazardous waste programs are: NJ, CA, MA, MI, MN, FL, KS, MO, NY.

- **Solid Waste and Recycling**—The 1970s witnessed an explosion of interest in recycling and alternatives to dumping 150 million tons of garbage in landfills each year. But markets for recycled materials and support for waste alternatives subsided in many states despite advances in technology. In the past few years federal support has swung behind the option of burning trash to create energy. But increasing costs and controversy over pollution from incineration plants has brought a number of city and state governments to consider new solid waste management systems that include large scale recycling, composting, and refuse-derived fuel plants.

The eight states which have taken the lead in addressing solid waste management problems are: NJ, CA, CT, MN, KY, MI, NY, WI.

- **Renewable Energy and Conservation**—Although renewable energy sources now provide nearly 10 percent of the nation's energy, support for development has been severely cut back. Federal renewable energy tax credits have been eliminated for residential systems. The Solar Energy and Energy Conservation Bank has been zeroed out of the federal budget. And federal research funding for renewable energy technologies has been slashed from $771 million in 1981 to $176 million in 1986. Coupled with this trend, only ten states have implemented laws and authorities to press utilities for least-cost energy development and seven of the twenty-four states with solar and conservation tax credits have seen these provisions expire in the last two years.

The six states with the best renewable energy and conservation policies are: CA, WI, IN, ME, MA, OR.

The general conclusion that can be drawn from these key topics is that the nation has reached a turning point in environmental progress. There is not only a recognition of the seriousness of the problems, but also a deepening realization of the high costs and tradeoffs needed to save soil, produce and use energy efficiently, and protect air and groundwater from contamination.

Cleanup of the 10,000 worst hazardous waste sites, for example, is expected to cost over $100 billion and take decades to complete. Reducing the volume of hazardous waste produced will likewise take time and involve hard choices. The same is true for reduction of solid wastes which will require tough decisions for the packaging and bottling industries. Some of the tradeoffs involve institutional changes as well. Development of renewable energy and greater energy efficiency, for example, raises the prospect of decentralizing the utility industry.

These are not decisions that will come easily. Issues of public health and protection of resources must be weighed with short and long term economic growth demands. Roles to be played by federal and state agencies need to be defined and coordinated. And most importantly, citizens living in communities affected by these decisions must be given a strong voice in decision-making. As responsibility for an array of research, monitoring, enforcement, and cleanup continues to shift to the states, the public's role will be vital in assuring adequate funding and tradeoffs to protect public health, resources, and sustained economic growth.

This report briefly outlines the progress states have made thus far, and the general stall that has taken shape in the past few years as realization of the costly dilemma of cleaning up the environment has emerged. The ranking of the states points out the relative strength of the legislation and programs. Not surprisingly, some states with the worst problems have the best programs. Also states with high per capita income are generally able to direct more funds to environmental protection. Despite tight funding, many states have shown great ability in developing innovative programs. But artful papering of environmental problems with legislation should not be mistaken for action and progress.

Wisconsin, which tops the combined rating list, did not rank first in any one category but showed a consistent high level of program strength—demonstrating broad commitment to the environment and public health. Ironically, Mississippi, which ranked last, did not receive needed federal assistance and funding because of a lack of state funding. A number of states with low per-capita incomes are caught in this dilemma. Details of the ranking process are contained on pages 32-33.

The matrix in each topic section shows that the problems and programs vary widely and that there is much states can learn from one another to achieve real and lasting gains. Hopefully, this information will encourage broader public understanding of the difficult decisions and tradeoffs ahead and the options within reach of each state. Readers interested in more extensive data on any of the topics can request one of the six appendix packets compiled in conjunction with this report. Ordering information is listed on the inside back cover.

STATE RANKING BREAKDOWN*

	AIR PROGRAMS	SOIL CONSERVATION PROGRAMS	GROUNDWATER PROGRAMS	HAZARDOUS WASTE PROGRAMS	SOLID WASTE PROGRAMS	RENEWABLE ENERGY & ENERGY CONSERVATION	TOTAL	RANK
AL	3	3	2	3	3	2	16	26
AK	7	3	3	2	2	1	18	25
AZ	7	3	7	5	2	3	27	19
AR	1	3	2	5	3	4	18	25
CA	10	3	7	9	9	10	48	2
CO	4	6	4	3	4	3	24	21
CT	9	6	9	4	9	7	44	4
DE	1	8	6	3	4	2	24	21
FL	7	4	9	8	6	7	41	7
GA	4	5	7	4	3	3	26	20
HI	4	4	3	2	2	4	19	24
ID	2	1	6	1	2	6	18	25
IL	7	9	5	7	7	6	41	7
IN	6	5	4	6	7	8	36	10
IA	5	10	5	5	7	7	39	8
KS	2	5	8	8	4	2	29	17
KY	7	3	1	6	8	3	28	18
LA	5	3	3	7	2	1	21	23
ME	3	6	7	6	6	8	36	10
MD	3	8	7	6	6	4	34	12
MA	6	4	8	9	6	8	41	7
MI	8	7	8	9	8	3	43	5
MN	5	6	5	9	9	4	38	9
MS	1	3	2	4	2	2	14	28
MO	5	6	7	8	1	4	31	15
MT	2	5	6	3	1	6	23	22
NE	4	6	6	2	6	7	31	15
NV	2	6	4	2	2	7	23	22
NH	6	5	5	7	5	4	32	14
NJ	9	6	7	10	10	5	47	3
NM	1	2	8	5	1	6	23	22
NY	5	5	10	8	8	7	43	5
NC	8	7	8	6	6	7	42	6
ND	1	3	4	2	3	3	16	26
OH	8	8	4	5	5	4	34	12
OK	5	5	5	4	7	3	29	17
OR	6	2	7	5	7	8	35	11
PA	8	6	5	5	3	5	32	14
RI	6	4	6	4	7	3	30	16
SC	6	5	7	5	2	6	31	15
SD	1	8	6	2	2	4	23	22
TN	3	3	4	7	5	7	29	17
TX	7	2	2	5	3	7	26	20
UT	3	4	3	2	1	3	16	26
VT	3	3	5	6	4	7	28	18
VA	8	7	6	2	3	7	33	13
WA	8	1	6	5	5	3	29	17
WV	2	5	2	4	1	1	15	27
WI	9	8	8	7	8	9	49	1
WY	1	3	8	1	2	1	16	26

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* see graphs on pages 30-31 and notes on pages 32-33

AIR POLLUTION REDUCTION

...How much work the states will be able to take on with new air pollution program remains uncertain.

Driving through Pittsburgh at night in the early 1970's the sky was often a ceiling of black smoke tinted by the city's lights. Outside Houston the heavy odor of petrochemicals would drift up over the highway. In Los Angeles and most other major cities daily weather reports frequently included alerts on the health danger of smog—a mixture of pollutants from buildings and car and truck exhaust.

Much of the more visible pollution once dumped into the air is now gone. Pittsburgh was recently chosen as the nation's most liveable city. Tall factory stacks no longer billow heavily laden black smoke in most areas. There are fewer smog warnings. And although pollution reduction goals set more than a decade ago have been steadily pushed back, the air is generally cleaner than it was in the early 1970s. In a simple dollar measure, one 1982 study found air pollution reduction costs of $17 billion resulted in saving $21.4 billion in health and property impacts.[1]

The primary reason for this progress is the federal Clean Air Act. First passed in 1963, the Clean Air Act set up a partnership between the federal and state governments to reduce air pollution. Amendments passed in 1970 put teeth into the law. The new Environmental Protection Agency was directed to adopt National Ambient Air Quality Standards for major pollutants. States were to develop State Implementation Plans (SIPs) to detail how they would meet the standards.

Seven major pollutants were targeted for reduction: particulates (ash, dust, etc), sulphur oxides, nitrogen oxides, carbon monoxide, hydrocarbons, ozone, and lead. The law required that primary standards to protect public health be met by 1975. Secondary standards to protect property were given extended deadlines. The states were to focus on "stationary" sources of pollution such as factories, commercial buildings, and dumps. And the federal government kept the authority to control the levels of pollutants from cars and trucks (except for California which already had standards in place).

The problem was that the law failed to spell out what would happen if standards were not met. As a result some states did little or nothing to implement plans. By 1975 it was apparent that the reduction goals were not going to be met. After heated debate, Congress passed a new set of amendments to the Clean Air Act in 1977. If the amendments in 1970 had teeth, those passed in 1977 offered a convincing bite.

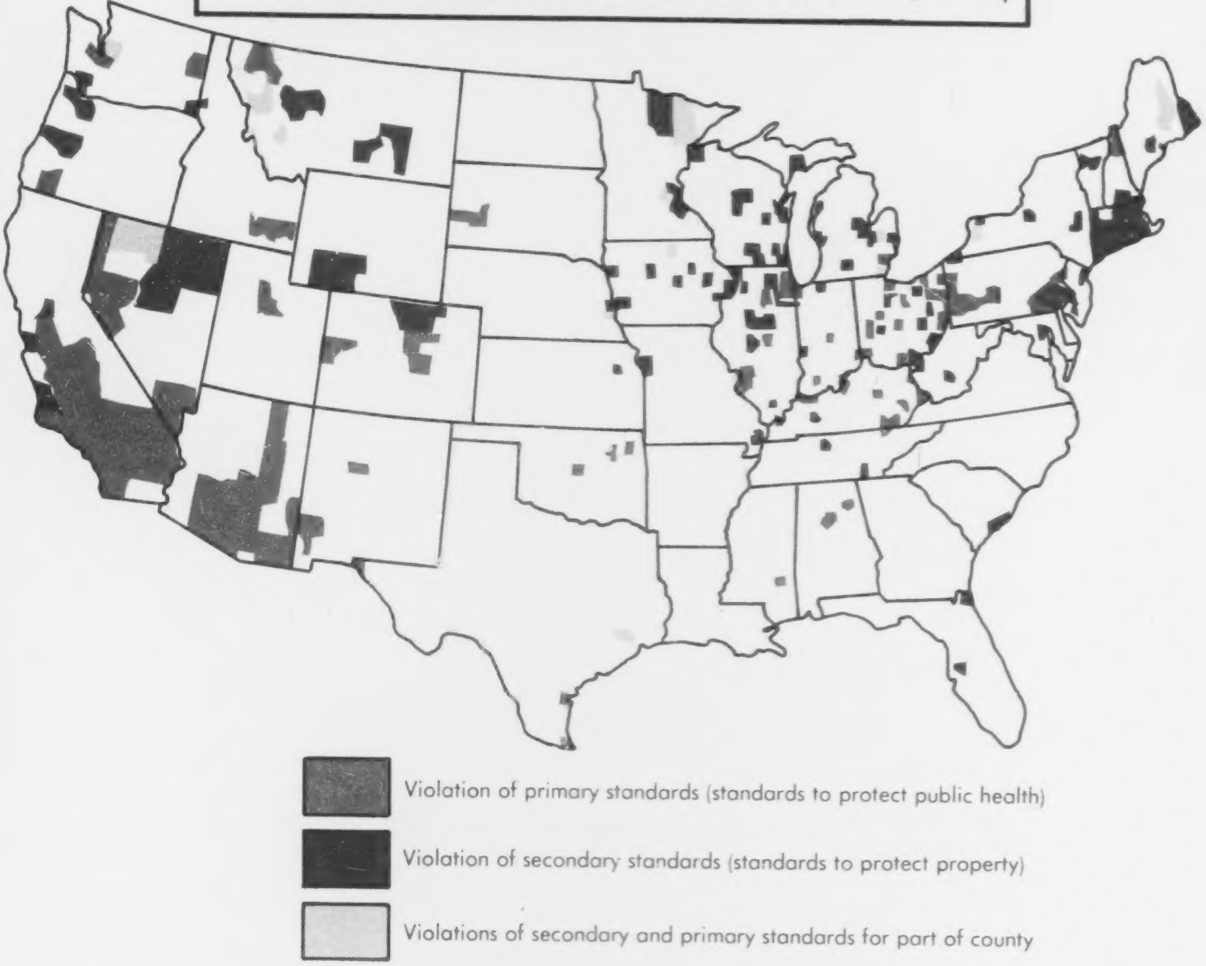
New deadlines were set to achieve health related reductions in pollution by December 31, 1982. Attainment of standards for ozone pollution or severe carbon monoxide problems were targeted for December 31, 1987. The secondary standards to protect property were to be met "as expeditiously as possible."

In order to assure that states would take these deadlines seriously, economic sanctions were put in place. Any state which had a nonattainment area was required to submit a new implementation plan. If the plan was not submitted and approved by EPA by July 1, 1979, construction of new industrial sources of air pollution could be prohibited and federal funds for highways, housing and sewage treatment plants could be withheld. Courts were also given authority to enforce any sanctions, if EPA failed to do so.

When the 1982 deadline arrived, most of the states failed to meet reduction goals for one or more pollutants. There were a number of reasons for this. Beginning in 1980, for example, EPA had allowed a new concept—emissions trading and a "bubble" approach— to accommodate the conflict between industrial expansion and the need to reduce pollution. In 32 states industries were allowed to buy and sell emissions credits to gain the cheapest pollution reduction for a given "bubble" area. A study published by the Conservation Foundation in 1986 found that although there had been considerable financial savings, the program accomplished few reductions in pollution.[2] As of December 1985, 22 states still needed to submit revisions of implementation plans. The threatened bite of sanctions in the law was apparently not strong enough. Since 1979 113 construction bans were put in place and three areas were placed under funding restrictions as sanctions for noncompliance.[3]

While the recession and increased energy efficiency slowed the growth of industrial air pollution, budget pressures and the need to attract and keep industry eroded the ability of some

COUNTIES THAT VIOLATE STANDARDS FOR SUSPENDED PARTICULATES (ASH, DUST, ETC.)


▨ Violation of primary standards (standards to protect public health)
■ Violation of secondary standards (standards to protect property)
□ Violations of secondary and primary standards for part of county

Data for September, 1985 SOURCE: EPA

states to move ahead with their programs. The "easy" gains had already been made. An EPA study which compiles the monitoring data of the past several years reveals the general impact of these complex events and the difficult point states reached.

Between 1975 and 1984 ambient levels of total suspended particulates were reduced by 20 percent by mass. But in 1984, particulate emissions increased 4 percent and ambient levels increased 2 percent. Sulphur dioxide, which contributes to acid rain and can cause respiratory damage also increased two percent between 1983 and 1984 after a decline in ambient levels of 36 percent. Carbon monoxide levels which had declined 34 percent between 1975 and 1984, decreased only 1 percent in 1984. Nitrogen dioxide which contributes to pneumonia and bronchitis increased from 1975 to 1979, decreased through 1983, and increased slightly in 1984. Ozone levels which had decreased 17 percent appeared to remain even in 1984. And ambient levels of lead—which can cause irreversible damage to the brain, kidneys, nervous system, and circulatory system—decreased 70 percent at 36 urban sites from 1975 to 1984, and between 1983 and 1984 declined 7 percent.[4]

Actions undertaken by the states to achieve and maintain this progress vary widely. California, which has severe air pollution problems because of metropolitan areas located in valleys, pioneered the most extensive air pollution

AIR MATRIX

	NUMBER OF COUNTIES WITH SIP DEFICIENCIES 1986[1]	CRITERIA POLLUTANTS EXCEEDING PRIMARY STANDARDS IN ONE OR MORE DESIGNATED AREA[2]	TOTAL NUMBER OF MONITORS FOR CRITERIA POLLUTANTS[3]	TOTAL ENFORCEMENT ACTIONS[4]	EPA SANCTIONS IMPOSED AS CONSEQUENCE FOR SIP DEFICIENCIES[5]	TOXIC POLLUTANT CONTROL PROGRAM IN PLACE	ACID DEPOSITION CONTROL PROGRAM IN PLACE	CONDUCTS RESEARCH ON ACID RAIN	1985 TOTAL AIR PROGRAM BUDGET	1982 TOTAL AIR PROGRAM BUDGET
AL	4	S,O,T	54	1,365	●	●		●	$2,034,531	$ 1,735,000
AK		C,	37	250				●	949,000	—
AZ	17	C,S,O,T,	78	467	●	●			1,742,200	1,433,300
AR			37	691		●			961,011	1,120,028
CA	35	C,N,O,T,	455	3970	●	●		●	47,879,000	56,406,000
CO	6	C,O,T,	107	470					4,382,000	3,313,000
CT		C,O,	120	1,196		●		●	4,133,820	—
DE		O,	31	177					1,083,962	—
FL	4	S,O,	250	822					3,903,501	—
GA	1	C,O,	23	2,797		●			2,744,943	2,406,633
HI		S,T,	27	142	●				871,000	752,000
ID		C,T,	24	531					691,000	—
IL	28	C,S,O,T,	213	4,892	●	●		●	4,871,600	5,033,600
IN	24	C,S,O,T,	119	2,220	●			●	4,209,137	3,661,181
IA	4	C,T,	86	1,923	●			●	1,031,050	1,178,042
KS	3	C,O,T,	31	2,695					988,428	—
KY	17	C,S,O,T,	184	1,700	●			●	3,167,100	3,355,900
LA	1	O,	66	2,399					3,482,000	2,960,000
ME		S,O,T,	127	533				●	948,700	763,400
MD		C,O,T,	110	646				●	3,318,161	2,194,808
MA		C,O,	99	2,053			●	●	4,814,000	3,967,000
MI	1	C,O,T,	161	1,853		●	●	●	4,557,100	4,627,100
MN	14	C,S,T,	70	1,087	●	●	●	●	2,677,131	—
MS		T,	28	687		●			1,121,000	1,108,334
MO	9	C,O,T,	139	1,442	●			●	2,870,900	—
MT	2	C,S,T,	111	181	●				870,000	797,000
NE	2	C,T,	74	2,696	●				359,852	270,481
NV	2	C,S,O,T,	38	210	●	●		●	536,553	445,821
NH	1	C,O,T,	68	278			●		792,488	—
NJ	18	C,O,	193	2,055		●		●	7,699,056	6,943,480
NM	1	C,S,T,	78	474	●			●	1,754,600	1,557,000
NY	3	C,O,T,	254	4,047	●	●	●		11,800,000	8,700,000
NC	2	C,O,	124	1,746				●	2,870,288	2,551,912
ND			43	235				●	820,399	916,956
OH	34	C,S,O,T,	390	3,869	●	n/a		●	4,453,278	3,786,921
OK	2	C,O,T,	95	702					1,917,169	1,739,000
OR	1	C,O,T,	37	948	●	●			6,377,000	6,084,000
PA	3	C,S,O,T,	223	3159		●		●	6,179,000	6,356,000
RI		C,O,	33	182				●	893,499	880,000
SC		C,O,	85	2,671		●			2,581,874	1,968,395
SD	1	T,	39	212				●	287,817	152,966
TN	2	C,N,S,O,T,	19	1,434	●	●		●	2,194,100	—
TX	8	C,O,T,	211	3,596	●	●		●	14,046,001	14,324,413
UT	1	C,S,O,T,	45	874	●				1,522,445	1,299,000
VT			13	132					606,752	618,000
VA	2	C,O,	153	1,381		●		●	4,886,557	4,571,083
WA	1	C,O,T,	131	627		●		●	1,629,620	—
WV		S,T,	77	538				●	1,710,535	—
WI		C,S,O,T,	159	1,749	●		●	●	3,837,000	3,272,000
WY			23	798					994,000	920,000

(for more extensive information see Air Appendix Packet)
(see notes on page 33)

program. In 1985 the state contributed nearly $50 million to the statewide air pollution control program (ten times that of most other states). Individual cities add to this effort with their own programs. One measure of the state's headway in this joint state-local effort is the fact that Californians witnessed the second lowest number of smog alerts in 1985 (83 compared to an average of 119) since 1964. State officials say the reason for this progress is that they control both mobile and industrial sources more stringently than the federal EPA and that they use regulations to help motivate development of new pollution control technologies. California's Air Resources Board has targeted an additional 25 percent reduction in emissions from cars and trucks in order to meet attainment standards by the year 2000.[5] But most recently, the steady growth of the air program in the 1970s has slowed and new toxic air, indoor air pollution, and acid rain programs are placing increased demands on the state.

Although reduction of the major criteria pollutants remains the cornerstone of air pollution control, newly discovered air pollution problems are demanding attention in every state. As in California, localized problems of indoor and toxic air pollution, regional problems from acid rain, and carbon dioxide build up in the atmosphere—the "greenhouse effect"—which threatens a global warming trend and sweeping climatic changes, and the global depletion of ozone, are adding a whole new agenda to air pollution prevention.

How much work the states will be able to take on with new air pollution problems remains uncertain. The partial success in meeting goals established by the Clean Air Act may foretell the future for new expensive air programs. The general indications are that the stall in progress could be lengthy. At least seven states reduced their air program budgets in 1985 and the federal government effectively froze its contributions. State and local agency grants totaled $94.3 million in 1981 and $96.3 million in 1986. According to the State and Territorial Air Pollution Program Administrators this trend has several impacts:[6]

- for the period of FY79- FY84 real values of federal funding for air pollution decreased 24 percent, and real value of non-federal funding decreased 6 percent;
- by 1984 air monitors had been cut back in 29 percent of the states;
- 47 percent of the most costly air monitors are in fair to poor condition and will need to be replaced during the next five years. Given the decrease in value of funding, and the high cost of monitors, further reduction of monitoring can be expected;
- unless significant new funding is appropriated, new programs or full implementation of programs for toxic air pollution may be delayed and programs for acid rain research and reduction are likely to be delayed at the state level;
- unless funding is maintained or increased current air pollution reduction deadlines will not be met.

The underlying issue in protecting the nation's air rests on how tradeoffs will be made with manufacturing, chemical, rubber, electric utility, automotive and oil industries. From the experience of the past decade and a half, it appears that the federal government will need to establish new incentives, support new monitoring systems and local enforcement, and encourage states and industry in efforts to carry out research. Without a renewal and strengthening of the federal/state partnership air pollution control may remain a hazy concept doomed to only partial realization.

AIR SNAPSHOT

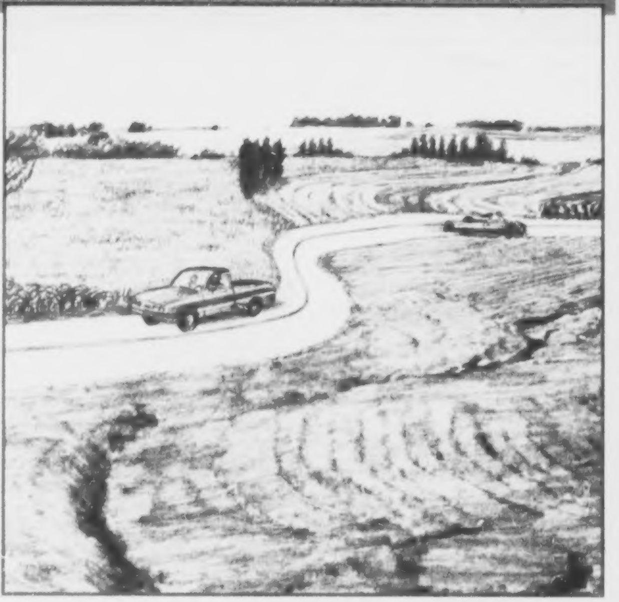
California offers the best working model for air pollution reduction policies and programs. The program combines a state Air Resources Board made up of technical experts with representatives of 44 county and regional air quality agencies. The local agencies are primarily responsible for controlling emissions of industrial facilities and the board provides financial and technical expertise and assists in enforcement of standards. The board also oversees a research program second in size only to the federal EPA.

In addition to integrated work at the state and local levels, federal support is essential in resolving regional problems such as acid rain, or participating in international efforts to curb global problems with carbon dioxide pollution or ozone depletion. Energy, manufacturing, and transportation industries also need to play a vital role in funding research, monitoring, and pollution reduction programs.

Barriers to greater progress in air pollution reduction are political, technical, and economic. Reduced funding, reluctance of industry to take responsibility for pollution, the need for more research, and political paralysis, all contribute to programs that are partially successful at best.
Currently:

- thirty-two states have deficient implementation plans (SIPs) in one or more counties;
- EPA has imposed sanctions on twenty-one states as a consequence of SIP deficiencies;
- six states have passed legislation addressing acid rain control (no federal acid rain law has been passed);
- twenty-nine states are conducting acid rain research;
- twenty states have initiated regulatory programs in the newly emerging field of toxic air pollutants;
- as of July 1985:
  - thirty-seven states exceeded the primary standard for CO
  - two states exeeded the primary standard for NOx
  - eighteen states exceeded the primary standard for SO2
  - thirty-five states exceeded the primary standard for O3
  - thirty-four states exceeded the primary standard for TSP

SOIL CONSERVATION



> . . . Ultimately, the solution may be tied to the changing nature of farms and agricultural economies.

The topsoil lifts off in fine brown clouds in the counties along the Iowa-Nebraska border. More than fourteen tons per acre are taken by the wind and rain every year. Along with part of the Texas Panhandle and the borderlands of Nevada, Arizona and southern California, this area has the heaviest erosion of anywhere in the country.

Rill erosion—primarily from water damage— and sheet erosion from water and wind vary widely from region to region. On average, cropland in the United States loses 4.4 tons per acre annually. In simple dollar amounts, the production problems caused by this erosion are estimated to cost $2 billion annually. Runoff carrying pesticides, herbicides and sediment into water supplies pushes estimates of erosion-related damage to $13 billion.[7]

Beyond the battering of drought and floods and wind, the methods and technology used in farming have much to do with the rates of soil loss. And added to these forces, cropland is also stripped by political and economic storms.

Some of the worst erosion in the nation's history came with a prolonged drought in the 1930s. More than a decade earlier, an increased demand for grain during World War One had accelerated the rate at which virgin grassy plains were ploughed under. Drought and dust had been a problem even for the pioneers who had begun farming the Great Plains with new steel plows in the 1860s. But the impact with which the 1930s drought hit ploughed grasslands was without precedent.

In May 1934 the worst storms hit carrying vast clouds of dust from the prairie. It buried farm buildings, crops, and pasture land. Huge clouds of dust were reported to have darkened the sun in Washington, D.C., sifted through the screens of office buildings in New York, and drifted for hundreds of miles out over the Atlantic.

Within a year, the federal government created the Soil Conservation Service to augment work already being done by the Civilian Conservation Corps and the fledgling Soil Erosion Service. In 1936 the Soil Conservation Service began to set up individual conservation agencies in each state and began to work directly with local farmers.

Steady progress was made in soil conservation until the early 1970s. Then, in order to meet increasing demands on the export market, a grain deal with the Russians, and food demands caused by drought in other parts of the world, Agriculture Secretary Earl Butz urged farmers to plant "fencerow to fencerow."[8] Just as the steel plow had helped break up the Great Plains, large new tractors with increased power made it easier to cultivate highly erodible rangelands and sandy hillsides. To accommodate the larger tractors, the size of fields increased and windbreaks and fallow strips between fields disappeared.

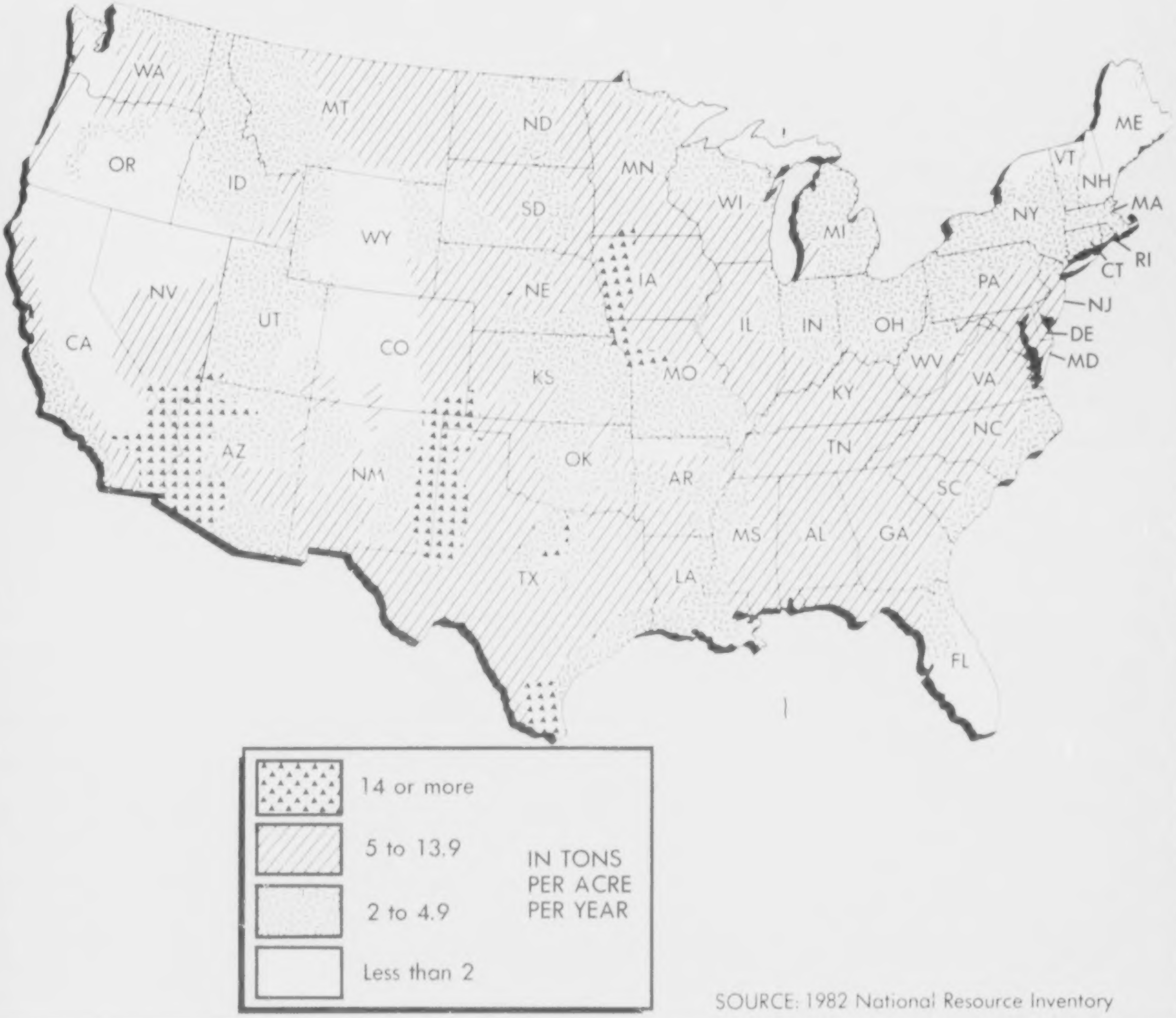
The amount of highly erodible soil under cultivation increased, and heavy soil loss became concentrated. In 1977 it was estimated that 25 million acres (six percent of the total cropland) was eroding in excess of 15 tons per acre. This land accounted for almost half of the total tonnage of cropland sheet and rill erosion.[9]

Today, a total of about 118 million acres of some 345 million acres of land classified as highly erodible are being cropped. According to the most recent surveys, the amount of cropland needing erosion control has been increasing in 26 states since 1977.[10] In targeting this erosion problem one of the chief questions which has arisen is whether participation in soil conservation programs should be voluntary or required by law.

In response to its major erosion problem, Iowa has developed one of the nation's best soil conservation programs. Unlike the voluntary programs in most states, Iowa has undertaken programs which regulate farming and land-use practices. It's a basic carrot and stick program. On the stick side, Iowa is the only state combining erosion and sediment control laws with soil loss limits and a penalty program. For the carrot—the state was the first to develop a cost-sharing program for soil and water conservation. Voluntary agreements to install and maintain approved conservation practices for 20 years are cost-shared 50/50 between farmers and the Soil Conservation District. Mandatory conservation practices adopted to comply with erosion control laws are cost-shared up to 75 percent.

In 1985 Iowa's state and local governments contributed more than $14 million to soil conservation. And of the 69 percent of the state's cropland needing conservation tillage—methods

AVERAGE ANNUAL EROSION OF CROPLAND
SHEET, RILL, AND WIND EROSION


WA
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GA
FL
SC
NC
VA
WV
PA
NY
VT
NH
ME
MA
RI
CT
NJ
DE
MD
14 or more
5 to 13.9
2 to 4.9
Less than 2
IN TONS
PER ACRE
PER YEAR

SOURCE: 1982 National Resource Inventory

such as reduced plowing and leaving crop residues on the field—51 percent was cultivated with these practices.[11] But like other areas, Iowa faces an on-going test to limit erosion and save more land, water and crops.

The presence of regulatory laws is sometimes enough of an incentive to assure conservation measures. In Vernon County, Wisconsin, an ordinance was passed in the mid-1970s that allows local residents to file a complaint if land is being mismanaged. Although courts can levy a fine of up to $200 per day if a farmer fails to comply with court-ordered conservation practices, peer pressure has reportedly sufficed in correcting problems.[12]

In Illinois, the state government and Soil Conservation Service have developed a program working through 98 conservation districts. Like Iowa's program, it includes soil loss limits, penalty actions, and cost-sharing. But in place of state erosion and sediment control statutes and a requirement for approved land-use plans, Illinois officials have targeted a voluntary goal of "T" by the year 2000. This means reaching acceptable tolerance limits for erosion in 15 years.[13]

Through the 1985 farm bill the federal government has also recently launched new voluntary and regulatory programs to reduce farming of highly

SOIL CONSERVATION MATRIX

	STATEWIDE CONSERVATION PROGRAM[1]	EROSION AND SEDIMENT CONTROL LAWS[2]	ESTABLISHED SOIL LOSS LIMITS	APPROVED PLAN REQUIRED BEFORE SOIL CAN BE DISTURBED	PROVISIONS FOR ENFORCEMENT AND PENALTIES	COST-SHARING FOR SOIL CONSERVATION	AVG. TONS LOST (SHEET & RILL) PER ACRE ON TOTAL CROPLAND[3] 1982	PERCENTAGE OF CROPLAND NEEDING EROSION CONTROL	PERCENTAGE OF TOTAL CULTIVATED ACRES IN CONSERVATION TILLAGE[4] 1982	FUNDS APPROPRIATED BY STATE & LOCAL GOV. FOR SOIL CONS. PROGRAMS 1985[5]
AL	•					•	7.1	63%	23%	2,290
AK	•						ND	ND•	20	733
AZ	•						0.5	15•	5	4,920
AR	•					•	4.9	45	12	3,619
CA	•						1.2	11•	3	7,997
CO	•	•		•			2.2	68•	36	627
CT	•	•		•		•	2.8	27	15	2,267
DE	•	•		•	E	•	2.0	17	77	5,748
FL	•				E		2.0	36•	8	3,223
GA	•	•		•			6.4	63•	23	5,266
HI	•	•					6.4	41•	1	2,125
ID	•					•	5.0	58•	24	518
IL	•		•		E,P,	•	7.0	43	33	14,764
IN	•						5.5	43•	41	3,991
IA	•	•	•	•	P	•	9.4	69•	51	14,227
KS	•					•	2.7	51•	51	4,484
KY	•						9.5	46	54	5,591
LA	•						4.6	40	5	3,965
ME	•	•		•		•	2.1	35	18	1,223
MD	•	•		•	E	•	5.0	46	69	5,515
MA	•						2.1	19	5	5,047
MI	•	•		•	E		2.6	36•	26	2,549
MN	•		•			•	2.5	53•	22	16,293
MS	•					•	7.5	42	15	1,141
MO	•					•	9.8	52	39	19,020
MT	•			•		•	1.6	61•	[illegible]	2,582
NE	•					•	5.2	34•	[illegible]	20,305
NV	•	•			E		0.1	5•	44	110
NH	•	•		•			1.2	40•	14	253
NJ	•	•		•		•	1.3	55•	29	2,757
NM	•						1.3	43•	38	645
NY	•	•		•			3.0	31	12	19,590
NC	•	•		•	E	•	6.8	45	29	6,997
ND	•						1.9	50•	23	2,096
OH	•	•	•	•	E	•	3.7	34•	37	11,374
OK	•	•				•	2.2	42	30	5,907
OR	•						4.0	53•	29	3,744
PA	•	•		•	E	•	5.3	53	43	1,201
RI	•						2.5	36•	8	80
SC	•	•		•		•	3.6	27	9	3,715
SD	•	•	•	•	E	•	2.6	40	35	1,221
TN	•						10.0	54	24	1,736
TX	•						2.6	55•	16	10,284
UT	•					•	0.8	21•	16	23,128
VT	•					•	1.3	12	5	280
VA	•	•		•	E	•	6.2	43	55	4,383
WA	•						4.5	69•	30	1,152
WV	•						2.6	19	47	3,085
WI	•	•	•	•		•	4.5	46	23	12,132
WY	•						1.0	20	13	421

(for more extensive information see Soil Conservation Matrix Packet)
(see notes on page 33)

• increased since 1977

erodible land. One voluntary program allows for a "conservation reserve" into which farmers can place highly erodible land for a period of 15 years in return for federal subsidies. Another provision establishes "sodbuster" regulations to discourage new cultivation on highly erodible land. Farmers producing crops on highly erodible land have until 1995 to put conservation plans into effect. Beyond that time they will lose USDA assistance for crops on any of their land. Farmers who attempt to farm virgin land without following a locally approved conservation plan will also be disqualified from receiving USDA benefits.

The most popular method of reducing erosion and keeping land in production is conservation tillage. The term refers to a variety of means that eliminate the use of the moldboard plow and leave some crop residues on the soil after harvest. Most conservation tillage methods also depend primarily on herbicides for weed control.

Critics argue that conservation tillage increases the threat of groundwater contamination. They advocate organic farming methods—legume-based crop rotations, biological pest control, cover crops, and shallow tillage— to reduce both erosion and minimize use of pesticides and herbicides. For farmers accustomed to conventional farm production, a shift to organic farming represents a change filled with uncertainties for meeting current debts and production levels. It seems to go against popular wisdom that using organic methods of production and reducing cost inputs will bring about increased profits.

Another problem for conventional farmers is that even with cost-sharing, many who need erosion control most can't afford to have the work done. Some are caught on a desperate treadmill. Because of high debt-to-income ratios they lack funds to experiment with organic farming or conservation tillage and can't seem to make a transition, thus costs and debt remain high. On top of this, some farmers doubt that federal government will follow through with the policies and assistance programs it has outlined.

The answer for soil conservation is tied to many factors. The 1985 farm bill is seen by many observers as a step in the right direction— setting up a long term cropland reserve program for highly erodible land and reducing the production-oriented aspects of USDA's technical and financial assistance. Nearly nine million acres of highly erodible land were placed in the conservation reserve during the first year. But significant difficulty may lie in future funding for the program and for assistance in formulating required conservation plans. The Soil Conservation Service received $312 million in 1981 for conservation operations, $364 million in 1985, and $348 million in 1986. According to SCS officials nearly 500 staff people have been terminated because of budget reductions. To meet the farm bill provisions, they say, would take all 5,400 field staffers, who would have to ignore other obligations and still the deadlines would not be met.[14]

Ultimately, the solution may be tied to the changing nature of farms and agricultural economics—whether the future trend will be toward large mechanized farms or smaller, more intensive organic farms. It depends as well on how land is seen for short or long term production value. States and the soil conservation districts will play an important role in developing both regulatory and voluntary programs. But beyond plans set in motion by government, the extent and success of soil conservation will ultimately be decided by economic pressures and the commitment of those farming the land.

SOIL SNAPSHOT

Iowa represents the best state program in soil conservation with policies that combine soil loss limits with land-use planning requirements. It also offers cost-sharing with farmers for implementation of conservation measures. Long term progress in soil conservation may rely on more than government land-use policy, however. Beyond regulations, incentives to take highly erodible land out of production, and use of conservation tillage are organic farming practices— legume-based crop rotations, biological pest control, the planting of cover crops, and shallow tillage—which have been shown to save significantly greater amounts of soil.

To bring such practices and beneficial programs into wider use will require substantial educational work, low interest loan funds for farms in transition, stable federal funding for soil conservation, and follow-through for programs such as the conservation reserve.

Currently:

- state and local cost-sharing and other financial incentive programs are in place in twenty-six states;
- twenty-one states have adopted a specific law for soil erosion and sedimentation control;
- eleven states have provisions for enforcement of state erosion and sediment control laws;
- an approved land-use plan is required before land can be disturbed in nineteen states;
- two states have state-enforced penalty provisions.
- six states have established soil loss limits.

SOLID WASTE & RECYCLING

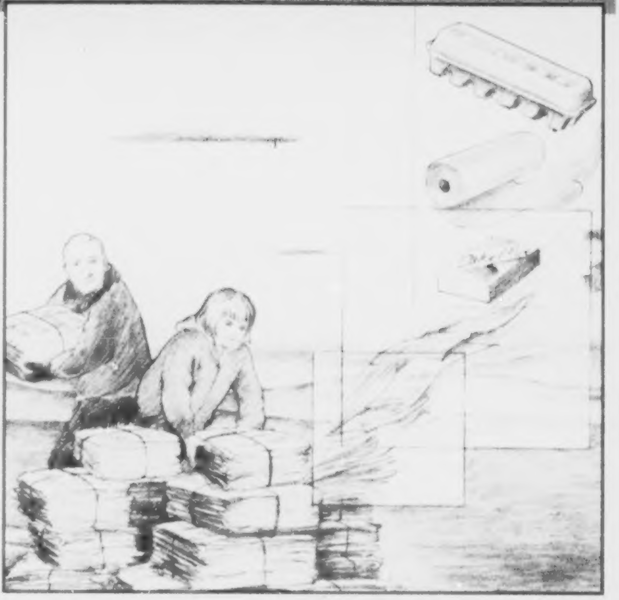
... Local solutions will not work without federal and state support.

More than half the cities in America will exhaust their current landfills by 1990. Already, rising mountains of trash overwhelm the sites of once self-contained town dumps, and thousands of dumps have been closed for pollution problems. Managing our growing volume of trash is one of the most urgent and fundamental environmental problems local officials face. Strategies that states and the federal government encourage, and the choices made by local communities will determine important tradeoffs in threats to groundwater, air pollution, the generation of energy, and the consumption of raw materials.

Americans produce 150 million tons of municipal trash each year—nearly 3.5 pounds per person per day. According to Franklin Associates, 37 percent of this residential and commercial waste is paper. Another 18 percent is yard waste, 8 percent is food waste, 10 percent is glass, 10 percent is metals, 7 percent is plastic, and the remainder is wood, rubber, textiles and miscellaneous inorganics. Currently about 8 percent of municipal trash is recycled, 5 percent is incinerated, and 87 percent is disposed of in landfills.[15]

Industry produces an additional amount of waste estimated to be as much as 350 million tons per year. Most industrial wastes are dumped in private landfills that are unregulated and unmonitored.[16]

The burgeoning solid waste problem reflects a trend in lifestyles and marketing of goods that emphasize shopping convenience, quick preparation and consumption, and easy disposal. Since 1960 the amount of waste generated by packaging has increased more than 200 percent (24 million tons in 1960 to 75 million tons in 1985). And the types of packaging include more mixed materials which are difficult if not impossible to recycle. Despite the growth in the volume of packaging, and in population, until recently there was only a sluggish response to warning signals of a mounting trash crisis.



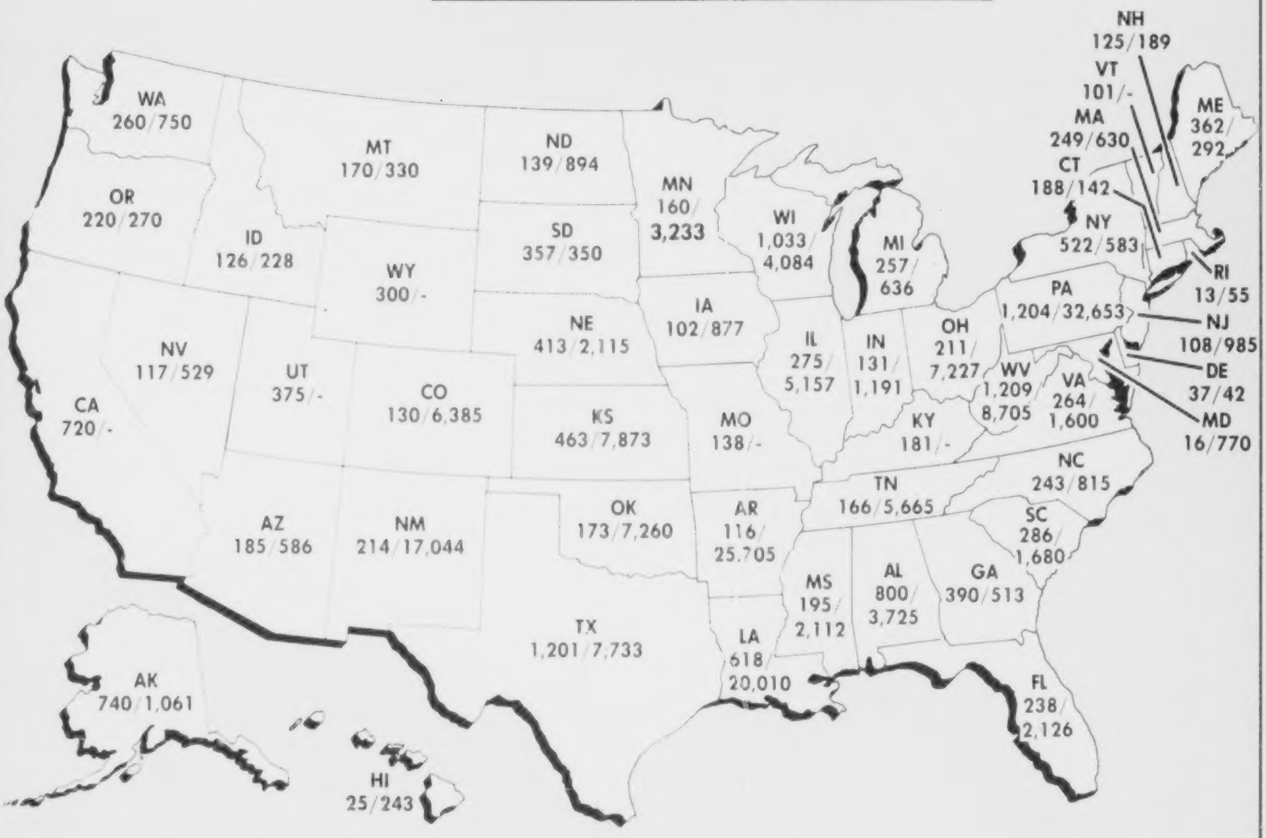
The first signals came in the early 1960s when increasing volumes of trash and unregulated dumping raised concerns about serious health and environmental threats. In response, Congress passed the Solid Waste Disposal Act of 1965. The act provided assistance to states undertaking research, surveys, and innovative solutions for waste management. Five years later, uncontrolled dumping was still the norm. Congress then passed the Resource Recovery Act of 1970 to promote state action. Additional funds for research and construction of advanced design landfills were provided and the federal government kept an advisory role. Most significantly, the act officially identified recycling as an economical and efficient means of reducing and managing waste for the first time.

Work carried out under the 1970 law helped to reveal not only the extent of uncontrolled dumping of solid waste, but also the risk involved with the dumping of hazardous, or toxic wastes. A few years later, in 1976, Congress passed the Resource Conservation and Recovery Act to address the growing complexity of waste management problems. To trace the dumping of hazardous waste the law set "cradle to grave" regulations. Nearly 200,000 surface impoundments—pits, ponds, and lagoons containing industrial, agricultural, and muncipal liquid wastes—were also covered by the law. And most importantly for solid waste, the law encouraged states to develop solid waste management plans and established minimum siting and operating standards for disposal facilities.[17]

As of October 1985, twenty-two states had solid waste management plans fully approved by EPA. But federal assistance and funding originally promised were not available. Federal funding under the solid waste Subtitle D program was cut from $13 million in 1981 to $0 in 1986. Because of federal funding cutbacks, no states received grants for solid waste management after 1981.[18] Nevertheless, while many states made little progress in solid waste management, several individual states, cities, and counties have pushed ahead.

Minnesota had taken an early lead in solid waste management by passing the Excess Packaging Act in 1973. The law was intended to reduce the volume of packaging of goods and to limit packaging to types which could be recycled. Courts upheld the statute but strong opposition from the packaging and bottling industry kept it from being implemented. In 1980 the state passed the Waste Management Act, a law often referred to as "planned agitation" because it forced counties to choose future landfill sites at the same time

SOLID WASTE LANDFILLS* AND LIQUID WASTE SITES**


NH 125/189
VT 101/-
MA 249/630
ME 362/292
CT 188/142
NY 522/583
RI 13/55
WA 260/750
MT 170/330
ND 139/894
MN 160/3,233
WI 1,033/4,084
MI 257/636
OR 220/270
ID 126/228
SD 357/350
WY 300/-
IA 102/877
PA 1,204/32,653
NJ 108/985
NE 413/2,115
NV 117/529
UT 375/-
CO 130/6,385
IL 275/5,157
IN 131/1,191
OH 211/7,227
WV 1,209/8,705
VA 264/1,600
DE 37/42
MD 16/770
CA 720/-
KS 463/7,873
MO 138/-
KY 181/-
NC 243/815
TN 166/5,665
SC 286/1,680
AZ 185/586
NM 214/17,044
OK 173/7,260
AR 116/25,705
MS 195/2,112
AL 800/3,725
GA 390/513
TX 1,201/7,733
LA 618/20,010
FL 238/2,126
AK 740/1,061
HI 25/243

*Subtitle D landfills (solid waste landfills) contain primarily municipal waste with some industrial and demolition debris waste as well. Subtitle D landfills do not include private industrial landfills.

16,416 / 185,053 -
total number of landfills | total number of liquid waste sites | no data

**Liquid waste sites (surface impoundments) primarily contain gas and oil waste but also include municipal, industrial, agricultural, and mining waste.

SOURCE: EPA

tests revealed contamination of groundwater. Alarmed by threats of groundwater contamination, citizens took a strong role in public meetings and advisory boards. Using the state mandate to emphasize recycling and waste reduction, they settled on strategies that utilize a variety of source separation, waste reduction, composting, incineration and minimal disposal in landfills.

New Jersey has seen a similar "agitation." Threats of widespread pollution forced closure of 217 of the state's 310 landfills between 1977 and 1985. Thirty of the closed landfills, which like many landfills contained significant amounts of toxic waste, were placed on the Superfund National Priority List or put under enforcement and cleanup actions by the state. The state's Solid Waste Management Act, passed in 1976, set up 22 solid waste districts charged with developing ten year plans for waste disposal. The law also encouraged development of waste-to-energy incineration plants and a subsequent law passed in 1981 targeted 25 percent recycling for New Jersey counties.[19]

SOLID WASTE MATRIX

	SOLID WASTE MANAGEMENT PLAN 1-5[1]	REGULATIONS FOR LANDFILL SAFETY AND CONTROL 1-4[2]	RECYCLING PROGRAM 1-4[3]	TOTAL MONITORING OF GROUNDWATER	TOTAL INSPECTIONS[4]	FREQUENCY OF INSPECTIONS	NUMBER OF GROUNDWATER VIOLATIONS	NUMBER OF SUBTITLE D LANDFILLS	NUMBER OF SUBTITLE D SURFACE IMPOUNDMENTS	ESTIMATED SOLID WASTE TONNAGE tons/day[5]
AL	1	3	4	134	730	twice/yr	30	800	3,725	6,983
AK	5	3	3	20	550	<once/2 yrs	7	740	1,061	875
AZ	1	4	4	7	142	once/yr	5	185	586	5,343
AR	1	4	3	21	254	twice/yr	7	116	25,705	4,111
CA	1	1	2	265	2,467	once/yr	24	720	—	44,839
CO	3	2	4	36	42	twice/yr	16	130	6,385	5,562
CT	1	1	2	115	263	twice/yr	87	188	142	5,520
DE	2	3	3	12	58	once/yr	6	37	42	1,073
FL	1	1	3	174	738	twice/yr	76	238	2,126	19,208
GA	1	3	4	26	710	once/yr	3	390	513	10,215
HI	4	4	3	1	106	>4x/yr		25	243	1,818
ID	3	3	4	8	361	twice/yr	6	126	228	1,752
IL	1	3	2	246	744	once/yr	76	275	5,157	20,144
IN	1	3	3	70	1,572	>4x/yr	8	131	1,191	9,622
IA	1	2	2	88	432	—	—	102	877	5,093
KS	3	1	4	42	963	twice/yr		463	7,873	4,267
KY	1	1	2	92	1,468	>4x/yr	—	181	—	6,515
LA	1	3	4	—	—	—	—	6:8	20,010	7,809
ME	3	1	3	61	475	twice/yr	115	362	292	2,023
MD	4	3	3	63	—	>4x/yr	1	16	770	7,611
MA	1	3	2	43	87	once/yr	136	249	630	10,147
MI	1	2	1	99	780	4x/yr	203	257	636	15,881
MN	1	1	1	124	850	>4x/yr	103	160	3,233	7,284
MS	1	3	4	6	481	4x/yr		195	2,112	4,547
MO	3	—	4	—	—	—	—	138	—	8,764
MT	3	4	4	20	240	twice/yr		170	330	1,442
NE	2	1	2	20	45	once/yr	4	413	2,115	2,811
NV	4	3	4	0	46	once/yr		117	529	1,594
NH	3	3	3	33	421	4x/yr	52	125	189	1,710
NJ	4	1	1	98	604	>4x/yr	30	108	985	13,151
NM	5	4	4	1	409	twice/yr	4	214	17,044	2,492
NY	4	1	1	99	1,110	once/yr	315	522	583	31,036
NC	1	2	3	79	85	once/2 yrs	1	243	815	10,789
ND	2	3	4	18	573	twice/yr		139	894	1,201
OH	1	3	2	53	—	4x/yr	12	211	7,227	18,816
OK	1	1	3	107	677	twice/yr	13	173	7,260	5,772
OR	2	3	1	20	300	once/yr	4	220	270	4,680
PA	1	4	1	195	2,120	>4x/yr	67	1,204	32,653	20,827
RI	3	3	3	13	156	other	8	13	55	1,684
SC	4	4	3	0	1,558	4x/yr	124	286	1,680	5,775
SD	3	4	4	10	410	4x/yr	12	357	350	1,236
TN	1	3	3	70	930	4x/yr	23	166	5,665	8,525
TX	1	1	4	93	—	once/yr	27	1,201	7,733	27,981
UT	4	—	4	—	—	—	—	375	—	2,891
VT	3	4	3	77	490	>4x/yr		101	—	928
VA	4	4	3	92	1,064	4x/yr	52	264	1,600	9,863
WA	2	4	2	25	26	<once/2 yrs	69	260	750	7,611
WV	4	4	3	31	730	once/yr	8	1,209	18,705	3,416
WI	2	2	1	148	2,005	once/yr	48	1,033	4,084	8,341
WY	4	4	4	99	307	once/yr	7	300	—	894

(for more extensive information see Solid Waste Matrix Packet)
(see notes on page 33)

Despite these laws, which have created some of the most comprehensive solid waste programs in the nation, New Jersey still expects a shortfall of solid waste capacity between 1991 and 2000. Environmentalists and community planners critical of the high costs and toxic wastes generated by incineration plants claim more recycling and composting are needed. Alternative solid waste managment advocates claim that ultimate solutions for waste problems lie in reducing waste by 5-10 percent, recycling 50 percent of the waste stream, composting 25-30 percent, and landfilling the remaining 10-30 percent.[20]

Several communities are testing the possibilities of such systems. Berkeley, California has launched a plan to recycle 50 percent of its wastes by 1991. Camden County, New Jersey is targeting 35 percent of its waste stream for recycling. And the city of East St. Louis is embarking on a major recycling program centered on a 2400 ton per day preprocessing plant which sorts out recyclable materials and leaves a minimal amount to be incinerated or disposed of in landfills.

The outcome of these strategies may influence the options other communities will have in the future for less costly and more benign solid waste disposal. But these local solutions will not work without federal and state support in marketing recycled goods and in helping finance pilot projects. Long term solutions will also require policymaking that will encourage the reduction of waste by the packaging and bottling industries.

SOLID WASTE SNAPSHOT

The best working model for solid waste management programs and policies is New Jersey. Despite a heavy reliance on construction of incineration plants, New Jersey is the first state to target 25 percent recycling for its counties, and require ten year plans from its 22 waste districts. The state also conducts frequent inspections and substantial monitoring for groundwater contamination at landfill sites.

Alternative waste management advocates claim that landfilling and incineration can be minimized by programs which encourage 5-10 percent waste reduction, recycling 50 percent of the waste stream, and 25-30 composting.

Currently:

- despite a decade of legislative activity only three states have mandated waste reduction;
- nine states have passed "bottle bill" legislation to encourage recycling of bottles;
- nine states offer tax breaks on recycling equipment, and five states are doing research into uses of recycled materials;
- twenty-two states have EPA-approved solid waste management plans;
- six states have partial approval from EPA for solid waste management plans;
- ten states have adopted plans and have submitted them to EPA for review;
- two states have submitted no waste management plans.

HAZARDOUS WASTE

. . . It will take more than $100 billion dollars and decades to clean up the worst 10,000 sites.

In 1978 the residents of Love Canal brought national attention to the tragedy of leaking hazardous waste dumps. After door-to-door organizing and public protests, government researchers confirmed the clustering of birth defects, miscarriages, cancer, and health problems that plagued the neighborhood. The source was toxic chemicals dumped and buried beneath the neighborhood decades earlier.

Since that time the Environmental Protection Agency has targeted 22,000 hazardous waste sites across the country for attention. Some government officials believe that this only scratches the surface of the problem. Researchers at the federal Office of Technology Assessment put the total number of contaminated sites at 600,000.[21]

While the tragedy at Love Canal, and those at Times Beach, Missouri and the Stringfellow Acid Pits near Glen Avon, California have become familiar stories, what is not well known is that it will take more than $100 billion dollars and decades to clean up the worst 10,000 sites.[22] In the meantime, many sites are likely to see emergency cleanup work, plastic caps and containment walls, in an attempt to minimize the damage. And beyond the long term work of cleaning up the sites, a more fundamental problem lies in efforts to reduce the volume of hazardous waste still being produced.

The generation of significant amounts of hazardous waste largely coincides with the growth of the chemical industry. From 1945 to 1970, the production of synthetic organic chemicals increased tenfold. Today, the chemical and manufacturing industries generate about 260 million tons of hazardous waste each year in the United States—one ton for every man, woman, and child.[23] Several federal studies including the most recent Environmental Protection Agency study and a 1983 Congressional Budget Office study cite Ohio, Illinois, California, Pennsylvania, New Jersey, New York, and Michigan as producing the largest volumes of hazardous waste.[24] About 90 percent of the waste is in liquid form—water from chemical processes and cooling systems laden with toxic compounds and heavy metals. Until a decade ago the primary solution for disposal was to bury 50 gallon drums of waste in landfills, or to dump it into pits, lagoons, or wells. As public awareness of the danger of toxic chemicals spread, new laws were passed by Congress to control their use and disposal

In 1976, when Congress passed the Resource Conservation and Recovery Act to address growing problems with disposal of both solid and hazardous waste, it also passed the Toxic Substances Control Act. TSCA was intended to regulate toxic chemicals throughout their manufacture, use and disposal cycles. Monitoring and research under these laws help to reveal the extent of hazardous waste contamination the nation faced.

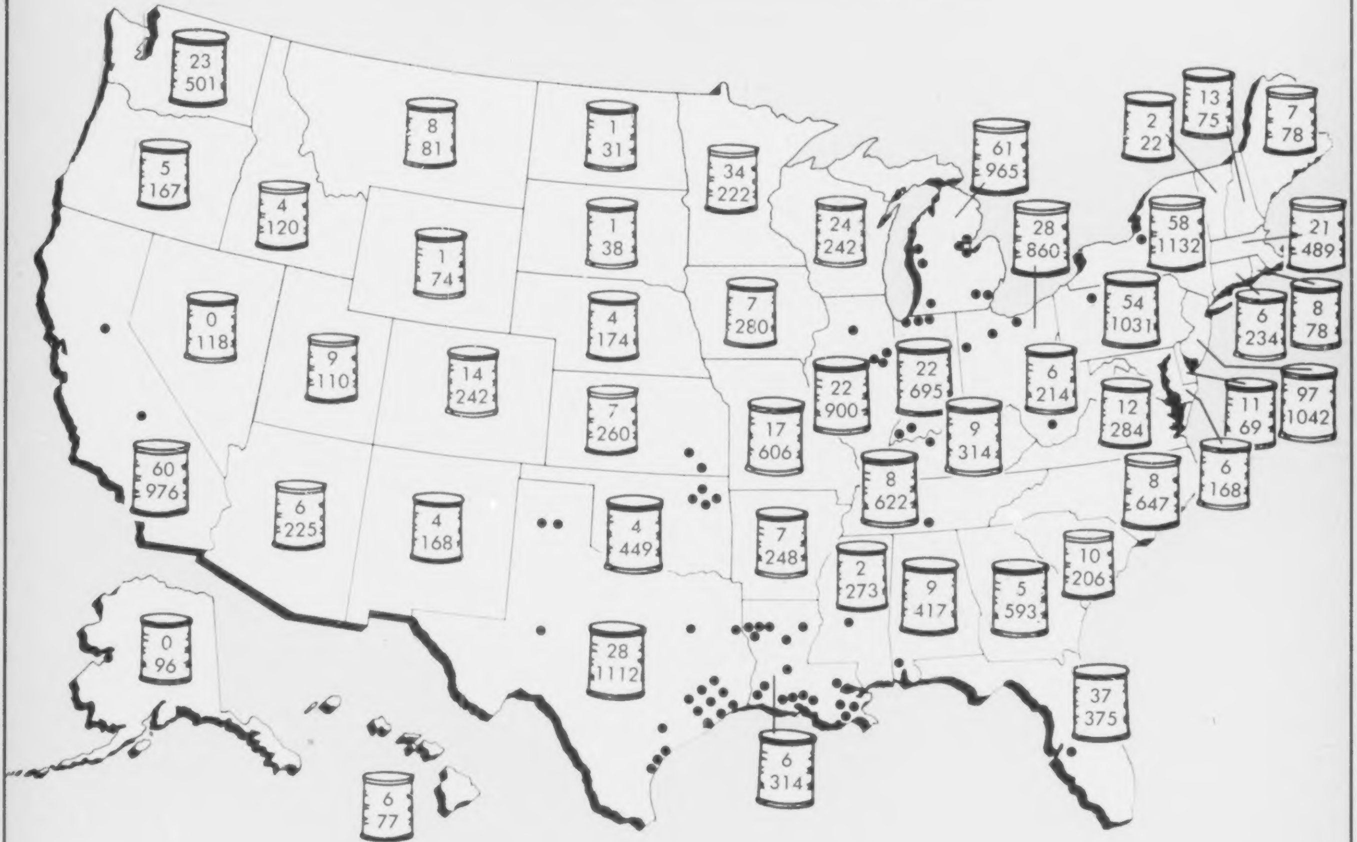
In 1980, Congress passed the Comprehensive Environmental Response, Compensation and Liability Act—Superfund. While the 1976 laws attempted to prevent pollution, Superfund targeted action to be undertaken once pollution was found. The five-year $1.6 billion project was to identify the worst hazardous waste sites and design and initiate remedial action.

State governments were given an important role in Superfund cleanups. In many cases EPA set up cooperative arrangements with states. Superfund would provide money, and a state agency would develop a workplan, schedule and budget, and oversee cleanup work. In other cases EPA took the lead and the state maintained an advisory role. Major problems arose due to the larger number of sites identified and insufficient funding. But more troubling was a lack of technology, experience, and training for adequate cleanup even where substantial funding was made available. Another problem was getting companies responsible for the contamination to accept liability and share in the costs. The policy of the Reagan administration was to litigate and negotiate settlements with companies, a process which stalled cleanup further.

From 1981 to 1986, only 13 sites were removed from the national priority list and remedial action was undertaken at 500 sites.[25] For 90 percent of the sites on the list, no long term action was begun in the first five years of the program. There was clearly not enough money or commitment.

EPA estimated that it would cost an average of $8.8 million to clean up a site on the national priorities list, and another $4 million to operate and maintain it. Out of 812 sites on the list in 1984, 64 percent were scheduled to receive $500,000 or less, and 10 percent

SUPERFUND AND OTHER HAZARDOUS WASTE SITES


23
501
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110
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242
4
174
7
260
34
222
24
242
7
280
61
965
60
976
6
225
4
168
4
449
28
1112
17
606
22
900
22
695
28
860
9
314
6
214
54
1031
58
1132
2
22
13
75
7
78
21
489
6
234
8
78
97
1042
11
69
6
168
12
284
8
647
8
622
7
248
2
273
9
417
5
593
10
206
37
375
6
314
0
96
6
77

888 — Total National Priority List Sites (includes proposed sites)

18,714— Total Emergency Response and Remedial Information System sites

⁘ **Hazardous waste injection facilities**

Note: These locations and figures do not include military hazardous waste sites. In 1984 Defense Department agencies produced more than 530,000 tons of hazardous waste at 333 installations.

SOURCE: EPA and National Campaign against Toxic Hazards

would receive $2 million or more.[26]

In response to the lethargy of the federal program and the lack of federal funds to clean up sites needing attention, 29 states implemented their own Superfund laws and provisions. In Massachusetts, the state legislature passed the "Massachusetts Oil and Hazardous Materials Release Prevention and Response Act" in 1983. As a counterpart to the federal Superfund program, it targeted cleanup of the 489 sites in the state not on EPA's national priority list. The law allows preventive actions and assessements as well as containment and cleanup. Individuals responsible for a release, or threat of release, for which the state incurs cleanup costs are strictly liable for up to three times the state's costs. The law also set up a $25 million fund for cleanups.[27]

The Massachusetts statute was modeled on similar laws in New York, California, and New Jersey. New York has approved a $1.2 billion fund for toxic cleanup at 500 sites. And New Jersey, which is acknowledged to have the most extensive hazardous materials policies, is expanding its $100 million

HAZARDOUS WASTE MATRIX

	STATE SUPERFUND STATUTES[1]	SMALL QUANTITY GENERATOR REGULATIONS[2]	UNDERGROUND INJECTION RESTRICTIONS	PRE-HSWA FINAL AUTHORIZATION[3]	COMMUNITY RIGHT TO KNOW[4]	INCENTIVES TO REDUCE/RECYCLE[5]	HOUSEHOLD HAZARDOUS WASTE COLLECTION[6]	NUMBER OF NATIONAL PRIORITY LIST (NPL) SITES	NUMBER OF ERRIS LIST SITES[7]	RANKING BY HAZARDOUS WASTE GENERATION[8]
AL			•			•		10	475	23
AK					•		S	0	108	46
AZ	•		•	•				9	251	39
AR	•			•				8	277	31
CA	•	•	•		•	•	C/L	61	1,622	4
CO				•				15	323	32
CT			•			•	S	7	294	21
DE				•	•			14	136	29
FL	•		•	•		•	S	39	801	17
GA				•		•		5	675	20
HI						•		6	85	48
ID								4	140	36
IL	•			•		•		25	1,068	3
IN	•			•		•		28	865	10
IA	•				•	•		13	337	27
KS	•	•	•	•		•		7	284	28
KY	•			•		•		10	383	22
LA	•	•	•	•	•			7	343	14
ME	•	•				•		21	96	37
MD	•	•		•	•	•		8	233	24
MA	•	•	•	•	•	•	C/L	7	628	16
MI	•	•			•	•	S	66	1,447	8
MN	•	•		•		•	S	38	304	25
MS				•		•		2	298	30
MO	•			•	•	•		17	867	13
MT				•	•			9	130	43
NE				•				5	204	38
NV				•				0	122	45
NH	•	•		•	•	•	S	13	119	40
NJ	•			•	•	•		97	1,238	1
NM	•			•			C/L	4	187	42
NY	•			•		•	C/L	65	1,242	7
NC				•	•	•		8	706	11
ND				•				1	36	49
OH	•					•	S	30	927	2
OK			•	•		•		5	503	33
OR	•			•	•	•	C/L	5	197	34
PA	•			•	•	•		65	1,908	5
RI		•		•	•	•	S	8	184	35
SC	•			•		•		12	310	15
SD				•				1	44	50
TN	•		•	•	•	•		8	689	9
TX	•			•	•			26	1,879	6
UT				•				10	149	41
VT	•	•		•	•		S	2	60	44
VA				•			C/L	13	376	12
WA	•			•	•		C/L	28	542	26
WV		•		•	•	•		6	278	19
WI	•	•		•		•	S	30	318	18
WY								1	87	51

(for more extensive information see Hazardous Waste Management Appendix Packet)
(see notes on page 34)

fund to $200 million.

The states will get a boost in support from the $8.5 billion dollar Superfund finally reauthorized in September 1986. Most importantly, the new five-year program will provide long-term cleanup funding previously expected to be bourne by the states; will set basic requirements for how clean a site must ultimately be; and include community-right-to-know provisions. These elements will generally encourage state and citizen involvement in cleanup.

But even as cleanup programs have raised new hope of moving ahead, shutdown of hazardous waste landfills and the continued production of more than 260 million tons of hazardous waste each year is creating new pressures. More than 60 percent of the hazardous waste now being produced is disposed of in "underground injection" facilities which use former oil wells or underground caverns to contain a variety of liquid hazardous wastes. Significant controversy has come to surround these sites and at least ten states have passed laws restricting their use.

The primary solution being urged is reduction of hazardous waste production through use of substitute chemicals, neutralization of hazardous chemicals on site, or recycling of waste. Because of the low cost of land disposal and underground injection, only 12 percent of the waste being generated is disposed of with state-of-the-art technology.[28] Greater use of recycling and neutralization of wastes will require incentives for industry. Another element that may force the issue is the emergence of community right-to-know laws which allow citizens access to information on what hazardous materials are being used or stored in their community. Twenty-one states have passed some form of this law. But generally, a difficult and costly period of transition for state government and industry lies ahead with great gains needing to be made in waste minimization and cleanup technology.

HAZARDOUS WASTE SNAPSHOT

Like solid waste management, the best working model for hazardous waste programs and policies is New Jersey. The most essential part of a state's policies are those which address reduction of hazardous waste generated by industry. Also important are laws that encourage: recycling of hazardous materials, household hazardous waste collection programs, small quantity generator regulations, and restrictions on underground injection. Citizen ability to take part in waste regulation through "right-to-know" laws are also vital. And the formulation of a comprehensive state Superfund to oversee cleanup of sites outside the scope of the federal Superfund is essential to protection of public health.

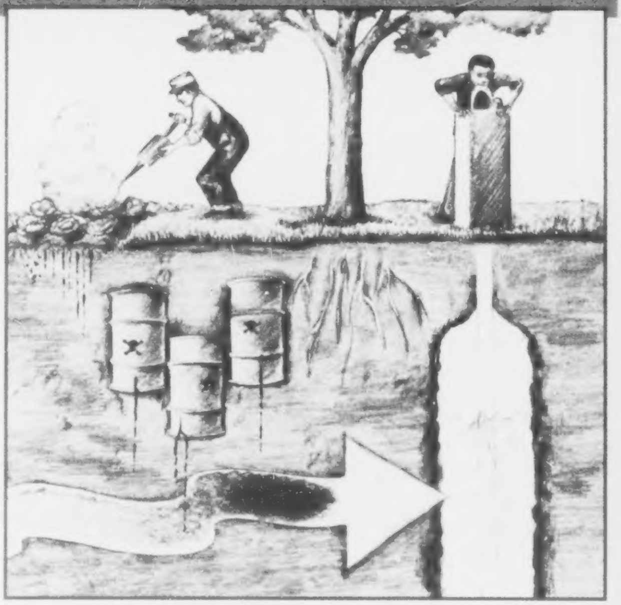
To create such programs and policies on a broad scale will take increasing cooperation between state and local government and industries that handle, store, generate, or dispose of hazardous materials.

Currently:

- thirty-one states have passed legislation on leaking underground storage tanks, and thirteen have regulations in place;
- household hazardous waste collection programs have taken place in seventeen states on a county, state, or local level,
- restrictions on underground injection of hazardous waste has been passed in ten states;
- thirteen states have regulations for small quantity generators more stringent than the federal Hazardous and Solid Waste Amendments (HSWA) that took effect September 22, 1986;
- thirty-nine states had received final EPA approval for the pre-HSWA program as of May 15, 1986;
- twenty-nine states have superfund statutes—(which at a minimum authorize the state to conduct a site assessment or force a responsible party to conduct an assessment).

GROUNDWATER PROTECTION

. . . **Almost $110 billion will be needed through the year 2000 to meet the nation's clean water goals.**



Groundwater, the nation's great hidden resource, is a domain infused with popular myths. Once it was believed that water purified itself as it passed through sandy soil. It was also thought that water moved so slowly underground that contamination spread at a snail's pace, if at all. Evidence uncovered in the past decade has begun to turn such myths around.

In 1976, groundwater monitoring at a 130 acre hazardous waste landfill in the town of Wilsonville, Illinois revealed contaminants migrating at a rate 100 to 1,000 times faster than predicted. Scientists were surprised. The site had a clay liner and was believed to be one of the best in the state. Researchers later found a substantial difference between what lab experiments had indicated about water movement and what actually happened in the field. Their findings provided support for a ban on landfilling of hazardous waste in Illinois and raised questions about similar landfills all across the country.[29]

Wilsonville isn't a special case. Problems that surfaced at thousands of hazardous waste sites and municipal dumps have helped to create a surge of interest in protecting groundwater.

The nation's aquifers are contained in vast networks of underground rivers, streams, ponds, and immense lakes. It is a hidden resource of immense importance. Groundwater supplies drinking water for half of our population. The nation's agricultural system is dependent on it. And its quality has a direct effect on our health. In total, underground aquifers in the continental United States are estimated to contain 16 times as much water as the Great Lakes. But despite this gigantic total volume, many individual aquifers face serious threats of contamination, or depletion, or both.

It takes a daily leak of only a single gallon of gasoline, for example, to contaminate millions of gallons of water. A report issued by the U.S. Environmental Protection Agency in August 1986 indicates as many as 300,000 underground gasoline storage tanks are leaking into the subsoil. Another EPA document identifies 12,442 incidents of leaking underground gasoline storage tanks reported to state governments. In Maine, 190 different incidents of gasoline contamination were confirmed between 1979 and 1984. In Florida, there were 223 incidents of groundwater contamination from petroleum leaks as of January 1984. And in a number of towns drinking water supplies have been rendered unusable.[30]

Such problems have sparked 21 states to pass laws regulating underground storage tanks, but only 13 have formulated regulations for storage tank programs. In conjunction with the 1986 Superfund reauthorization the federal government has allocated $500 million for leaking underground storage tanks. Primary responsibility is being left to state and local government, however, and there is a "Catch 22" for states which may need the funding the most: If a state has not launched a program because of a lack of state funds it may be ineligible to receive federal funds. This could result in delays in locating contamination, causing both the extent of the contamination and ultimate cleanup costs to grow.

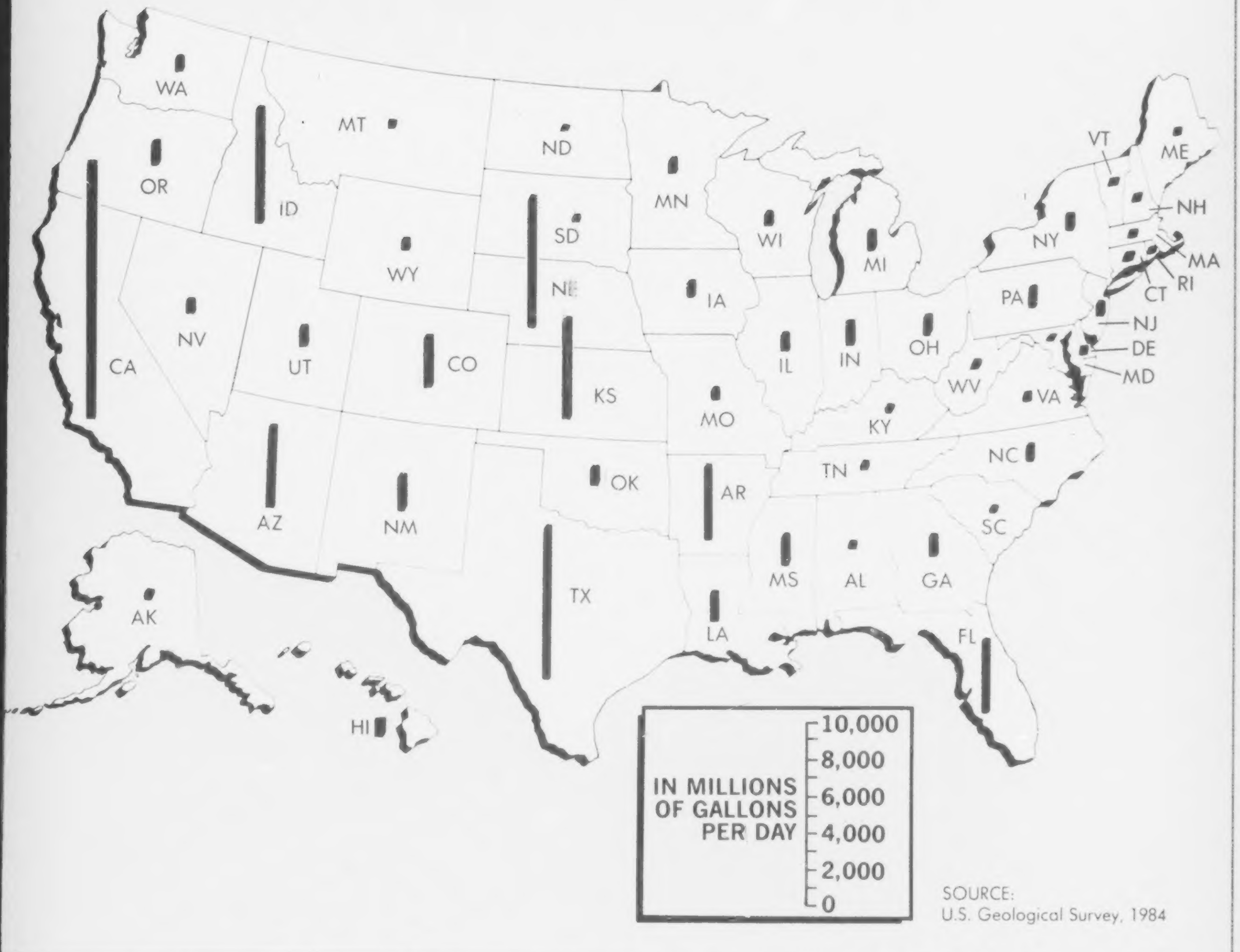
Groundwater supplies are also threatened by "nonpoint source" pollution—agricultural runoff from pesticides, herbicides, and salt leached from highways. In rural areas where 90 percent of the population is dependent on groundwater for drinking, heavy use of chemicals on the land over the past thirty years has resulted in steadily increasing contamination.

In Kansas, pesticides were detected in 11 percent of the wells tested in 1972. This rose to 72-78 percent of the same wells in 1983 and 1984. In Iowa, pesticide concentrations were found in 55 percent of the wells sampled in one study. In Nebraska, another study showed 70 percent of the wells tested to be contaminated. In some cases the problems were from pesticides or fertilizers which had originally been expected to decay rapidly and pose no danger to water supplies.[31]

The most tragic fact is that once groundwater has become contaminated it is difficult and costly, if not impossible, to clean up. Consequently, emphasis is now being placed on programs which gather more data, unravel the myths, and find ways to limit further contamination of aquifers.

Innovative and urgent work is being undertaken by both private organizations and state governments. In Michigan, for example, more than 1,000 incidents of groundwater contamination are currently identified. The state

GROUNDWATER WITHDRAWALS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SOURCE:
U.S. Geological Survey, 1984

Department of Natural Resources estimates that as many as 50,000 sites in the state could experience contamination. The cleanup costs are estimated to exceed $3 billion. The Science for Citizens Center at Western Michigan University has launched a program to map the aquifers in 17 counties that make up about one quarter of the state. The three dimensional computer map generated by the project will show both the volume and the flow of area aquifers. It will provide a vital tool for land use planning decisions. And the mapping program could become a much needed model for the state, helping to limit or prevent contamination from the 50,000 potential problem sites.[12]

To address the problem of groundwater contamination most states need technical assistance, as well as funding and models for research. The U.S. Geological Survey has recently mapped major aquifer systems and in 1984 EPA began efforts to support development of state groundwater strategy plans. Twenty-eight states currently have groundwater strategy management

GROUNDWATER MATRIX

	LEGISLATIVE AUTHORITY TO IMPLEMENT STRATEGY MNGT.[1] PLAN	GROUNDWATER STRATEGY MNGT. PLAN IN PLACE	GROUNDWATER QUALITY STAND. IN PLACE	STRATEGY PLAN INCLUDES MAPPING	LEAKING UNDERGROUND STORAGE TANK LEGISLATION[2]	NON-DEGREDATION OR LIMITED DEGREDATION AS STATE POLICY[3]	MONITORING FOR PESTICIDES, SALT WATER INTRUSION, HAZ. WASTE, NON-HAZ. WASTE[4]	STATE POLICY FOR CONTROLLED LAND USE AREAS	PERCENTAGE OF POPULATION SERVED BY GROUNDWATER	GROUNDWATER WITHDRAWAL PER DAY (MGAL)[5]
AL							NH,SW,HW		52%	290
AK			•				P		69	49
AZ	•	•					P,HW,NH	•	65	4,200
AR							HW		50	4,300
CA	•			•	•	N	P,HW		46	14,600
CO	•	•			•			•	15	2,800
CT	•	•	•	•	•		P,HW,NH		32	150
DE	•	•		•	•		P,HW,NH		60	82
FL	•	•	•		•		P,SW,NH	•	90	3,800
GA	•	•		•		N	P,SW,HW,NH		48	1,200
HI		•		•			P	•	95	710
ID	•	•		•			P,HW,NH	•	88	6,300
IL	•	•	•	•			HW		49	980
IN	•	•		•			HW		32	1,200
IA	•				•	N	P	•	82	900
KS	•	•		•	•		P,SW,HW,NH	•	49	5,600
KY	•								31	180
LA					•		HW	•	69	1,800
ME	•	•		•	•	N	P,HW,NH		57	80
MD	•		•		•		HW,NH		30	175
MA	•	•	•	•			P,HW,NH		33	320
MI	•	•	•		•	N	HW,NH	•	43	530
MN	•		•				P,HW,NH	•	75	670
MS	•							•	93	1,500
MO	•		•	•		N	P,HW		34	470
MT			•			N	P	•	54	200
NE	•	•	•	•			NH	•	82	7,100
NV	•						HW,NH	•	50	710
NH			•		•	N	P,HW,NH		60	65
NJ	•	•	•	•			HW,SW,NH	•	45	730
NM	•	•	•	•		L	P,SW,HW,NH	•	89	1,800
NY	•	•	•	•	•	L	P,SW,HW,NH	•	35	970
NC	•	•	•	•	•		HW,SW,NH	•	55	770
ND	•			•			P,HW,NH		62	110
OH	•			•			HW,NH		42	740
OK	•	•		•	•		P		41	960
OR	•	•				L	P,HW,NH	•	61	1,100
PA	•			•		L	P,HW,	•	44	1,000
RI	•	•		•		N	P,HW,NH		24	37
SC		•	•	•	•		P,SW,HW,NH	•	42	210
SD		•		•	•		P,HW,NH		77	330
TN		•	•	•			P		51	460
TX							P,SW,HW,NH	•	47	9,700
UT					•			•	63	772
VT		•			•		P,HW,NH		56	45
VA		•	•	•			P,SW,HW	•	46	370
WA	•			•			P,SW,HW,NH	•	71	750
WV				•			P,HW		53	220
WI	•		•		•	L	P,HW,NH		70	580
WY	•	•	•	•	•		NH	•	54	540

(for more extensive information see Groundwater Appendix Packet)
(see notes on page 34)

plans in place. And 29 states have indicated additional mapping as part of their plans. Land-use planning to protect aquifer recharge areas, such as wetlands, is one of the most essential elements of state policy. In general, state activities fall into a continuum with efforts to limit specific contamination at one end and comprehensive systems to address both contamination and availability of groundwater at the other. The most stringent policy, passed by nine states, mandates nondegradation of water quality. Five other states allow limited degradation, and the remainder have no formal policy.

The federal government helps states oversee groundwater protection with a patchwork of 16 federal laws. Federal soil erosion laws aim at reducing nonpoint source pollution of water supplies, for example, and the 1984 amendments to the Resource Conservation and Recovery Act require groundwater monitoring at hazardous waste and solid waste dumpsites. Currently, more than two dozen federal agencies and offices are responsible for some aspect of groundwater protection. According to EPA almost $110 billion will be needed through the year 2000 to meet the nation's clean water goals.[33] Unfortunately, federal aid is being sharply curtailed, leaving some question as to how the goals will be met.

Recognizing that a new groundwater project is not likely to receive federal funding, environmentalists are pressing for greater coordination of government programs. Support is now building for legislation to establish a national groundwater protection goal and an interagency task force to oversee progress toward the goal. There are three main options for the goal: a policy of non-degradation, maintaining water at its existing quality; protecting quality at some newly established standard; or accepting a need for sacrifice of some aquifers and distinguishing among them and setting levels of protection on each type.[34]

The debate in 1987 promises to be intense. And whatever the outcome, primary responsibility for implementing the national policy will fall to the states.

GROUNDWATER SNAPSHOT

The best state policies and programs to protect groundwater have been formulated by New York. As with many environmental problems, the most effective state groundwater programs combine establishment of local agencies and a statewide coordinating office. The organization operates under a statewide strategy and carries out mapping of aquifers; monitoring for pesticides, hazardous waste, salt water, and nonhazardous waste; tests for leaking underground storage tanks, and coordinates land-use policy with needs to protect aquifer recharge areas. A number of states have contained their commitment to groundwater protection in a policy of nondegradation of groundwater quality.

The most significant barriers for such programs and policies are the lack of funding, the lack of coordination between agencies, and the lack of detailed hydrological information for most areas.

Currently:

- nine states have adopted nondegradation as a state policy, and five states allow limited degradation;
- twenty-six states control land-use areas to reduce contamination threats to aquifers;
- twenty-one states have passed legislation on leaking underground storage tanks, and thirteen have regulations in place;
- twenty-nine states are conducting, or plan to conduct underground aquifer mapping;
- thirty-three states monitor for two or more pesticides;
- thirty-seven states monitor hazardous waste sites for groundwater contamination;
- twenty-eight states have a groundwater strategy/management plan in place.

RENEWABLE ENERGY & CONSERVATION

. . . The question is whether we need to suffer severe energy crises in order to change our policies.

Every major city and state government faces a quiet crisis over energy use. Even those which now enjoy a glut of electricity or natural gas, or relatively cheap oil, are approaching a period in which planning time and options will begin to close out. Officials at the US Department of Energy currently predict substantial ~~increases in oil~~ imports from the Middle East by the mid-1990s. They also point to the possibility of brownouts and blackouts unless construction of new generating plants is begun.[55] And despite the controversy over these predictions, and their implications for national security and the environment, everyone agrees that energy prices will inevitably rise and place growing pressure on local and regional economies. The question is whether we need to suffer severe energy crises in order to change our policies.

In the last decade, renewable energy and conservation (using energy more efficiently) have become the most promising solutions for avoiding new energy crises. Since 1974 more efficient use of energy has helped to diminish projected growth in energy demands for the year 2000 by half—and substantially reduced the need for oil imports and new power plants. Annual growth in electricity needs, for example, has dropped from seven percent per year to less than two percent per year.[56] Overall, the nation is about 24 percent more efficient in its energy use today than in 1973.

It's generally acknowledged that this energy efficiency is only scratching the surface of much greater potential. Energy efficient bulbs now on the market have the potential to save half the electricity now used for lighting. Variable drives on electric motors could save one third the electricity they consume. And energy efficient home appliances are projected to save half the electricity they now use. A 1983 Congressional Research Service study reported a cost effective conservation potential for 161,000 megawatts of electricity by 1990 and 214,000 megawatts by the year 2000—equal to more than 200 large nuclear plants.[57]

Renewable energy sources such as solar, wind, biomass, hydro, and geothermal also hold bright prospects. In 1979, the federal government estimated 20 percent of the nation's energy could come from renewable energy technologies by the year 2000. Today renewable energy sources supply 9.6 percent of total U.S. energy production.[58] The problem in doubling renewable energy supply in the next fifteen years—and increasing energy efficiency as well—is a lack of on-going political commitment.

Energy policy-making is largely crisis oriented. In response to the oil shocks of 1973 and 1979 Congress passed a half dozen laws to involve states in promoting energy efficiency.

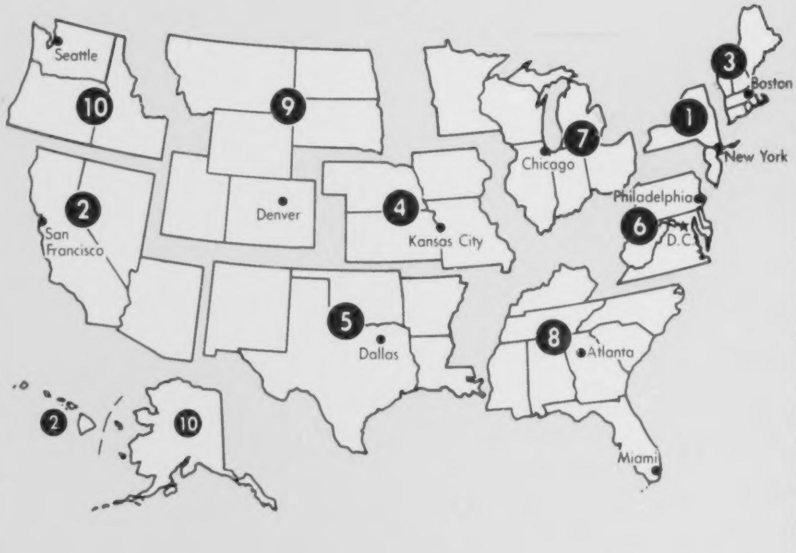
The State Energy Conservation Program, put in place by Congress in the mid-1970s, encouraged states to set up state energy offices with a goal of reducing energy consumption in each state by 5 percent by 1980. Although the goal wasn't met, the state energy offices laid the basis for new energy planning through an array of projects and educational activities. The agencies also administered federal funds for several programs. One program was the Residential Conservation Service (RCS). From May 1981 to April 1984 RCS funds supported energy audits for three million homes. Another state-administered program was the Solar Energy and Energy Conservation Bank which offered grants and low interest loans to homeowners for solar and conservation improvements. As of 1985, 38 states had received more than $18 million with another $42 million obligated.

The federal government also stimulated energy efficiency by offering a "conservation tax credit" to homeowners. Between 1979 and 1984 more than 28 million taxpayers—representing about one third of all households in the United States—claimed the credit, saving an estimated 6.5 billion barrels of oil at a cost of less than $10 per barrel.

Similar tax credits were also offered for renewable energy equipment. To help build markets and attract investment capital, the Energy Tax Act of 1978 established an array of income tax credits for residential and commercial purchase of solar, wind, or other energy equipment. Following the federal lead, 24 states added income tax credits for purchase of renewable energy equipment.

AVERAGE ENERGY BILL FOR ELECTRICITY, FUEL OIL, AND NATURAL GAS

	Electricity[1] (cents per kilowatt hour)	Fuel Oil[2] (cents per gallon)	Natural Gas[3] ($'s per 1000 cubic feet)
Northeast (#1)	11.63		
New York		101.8	$6.01-7.00
New Jersey		96.2	6.01-7.00
Pacific (#2)	9.64		
California		NA	5.01-6.00
Nevada		NA	5.01-6.00
Arizona		NA	5.01-6.00
Hawaii		NA	> 7.01
New England (#3)	9.21		
Connecticut		103.5	> 7.01
Maine		96.0	> 7.01
Massachusetts		99.9	6.01-7.00
New Hampshire		97.4	6.01-7.00
Rhode Island		102.9	6.01-7.00
Vermont		102.1	5.01-6.00
Central Plain (#4)	8.62		
Kansas		NA	3.10-4.00
Iowa		NA	4.01-5.00
Missouri		NA	5.01-6.00
Nebraska		NA	4.01-5.00
Southwest (#5)	8.46		
New Mexico		NA	4.01-5.00
Oklahoma		NA	3.01-4.00
Arkansas		NA	3.01-4.00
Louisiana		NA	3.01-4.00
Texas		NA	3.01-4.00
Mid-Atlantic (#6)	8.10		
Pennsylvania		93.1	5.01-6.00
Delaware		96.7	6.01-7.00
Maryland		94.1	6.01-7.00
District of Columbia		92.4	6.01-7.00
Virginia		89.7	5.01-6.00
West Virginia		87.7	5.01-6.00
Midwest (#7)	8.06		
Michigan		92.0	5.01-6.00
Ohio		86.6	5.01-6.00
Illinois		85.8	5.01-6.00
Indiana		85.1	4.01-5.00
Wisconsin		90.9	5.01-6.00
Minnesota		91.7	5.01-6.00
Southern (#8)	7.41		
Kentucky		NA	4.01-5.00
Tennessee		NA	4.01-5.00
North Carolina		NA	5.01-6.00
South Carolina		NA	5.01-6.00
Georgia		NA	5.01-6.00
Alabama		NA	4.01-5.00
Mississippi		NA	3.01-4.00
Florida		NA	3.01-4.00
Rocky Mountain (#9)	6.91		
Montana		NA	4.01-5.00
North Dakota		NA	5.01-6.00
South Dakota		NA	4.01-5.00
Wyoming		NA	4.01-5.00
Utah		NA	4.01-5.00
Colorado		NA	4.01-5.00
Northwest (#10)	4.78		
Oregon		84.0	5.01-6.00
Washington		85.3	5.01-6.00
Idaho		89.3	5.01-6.00
Alaska		94.1	0.0-3.00



[1] **Electricity:** Figures are for 210 major private power companies and do not includes rates for 2,194 public power systems (which average 30 percent less); rates are not included for 870 rural electric cooperatives. Private power companies provide 78 percent of the nation's electricity.
Figures denote average cost in cents per kilowatt hour at 500 kilowatt hour rate. Nationwide average for 1984: 8.22 cents per kwh. The regional grouping of states is NARUC's. (source: National Association of Regulatory Utility Commissioners, Washington, D.C.).

[2] **Fuel Oil:** Fuel oil prices are for No. 2 distillate at average 1985 residential end-user rates excluding tax. EIA has not gathered information for many states which it considers low volume users. (source: Energy Information Administration, Washington, D.C.).

[3] **Natural Gas:** Natural gas prices are 1985 averages for delivery to all types of consumers in dollars per thousand cubic feet. (source: Energy Information Administration, Washington, D.C.).

Congress also passed the Public Utility Regulatory Policy Act (PURPA) to spur greater competition in the utility industry and provide incentives for development of diverse small power generators. Under this law states were to develop guidelines for assuring competition which advocates hoped would foster development of "least-cost" energy production.

One of the most efficient and immediate electricity production alternatives is cogeneration—using industrial boilers to make both electricity and steam for heating and production processes. The federal office of Technology Assessment estimates a potential for 200,000 megawatts of cogeneration by the year 2000.

Despite the initial headway made by these programs, the potential for energy to be saved or produced, and the threat of new energy crises, the Reagan administration began a dramatic transformation in energy policy in 1981. The new emphasis was on increased production of energy, from traditional sources rather than increased efficiency. The Public Utility Regulatory Policy Act

ENERGY MATRIX

	LEAST COST PROVISIONS & REGULATIONS[1]	INCOME TAX CREDITS FOR SOLAR AND RENEWABLE ENERGY SYSTEMS[2]	TAX CREDIT EXPIRATION DATE	% USE OF AVAILABLE[3] SOLAR ENERGY & ENERGY CONS. BANK 1982-1986		BUILDING CODE PROVISIONS[4]	APPLIANCE EFFICIENCY STANDARDS[5]	CONST.-WORK IN PROGRESS POLICY[6]
				CONSERVATION	SOLAR			
AL	3	N		8.42%	128%			No
AK	3	N		—	—			—
AZ	3	25% res. & comm.	12/87	12.04%	84.88%			partial
AR	2	N		97.67%	—			partial
CA	1	10% res./25% comm.	12/86	79.76%	9.06%	•	•	No
CO	3	30% comm.	12/86	38.88%	—			partial
CT	2	30% comm.	12/86	55.74	87.97			partial
DE	3	$200 flat credited res. only	open-ended	—	8.93			—
FL	1	N		93.95	25.93	•		partial
GA	3	10-20% res. & comm.	12/89	84.11	—			partial
HI	3	15% res. & comm.	12/92	—	53.33			No
ID	2	10% res. only	open-ended	70.30	—			No
IL	1	N		94.01	—			partial
IN	2	25% res. & comm.	12/87	92.06	100			No
IA	1	N		101.19	76.00			No
KS	3	N		82.22	—			partial
KY	3	15% res. & comm.	12/86	74.07	74.00			partial
LA	3	N		—	—			partial
ME	1	20% res.	12/88	79.85	52.00		•	partial
MD	2	N		—	—			partial
MA	2	35% res.	12/87	94.09	97.67	•	•	No
MI	3	15-30% res.	12/88	88	3.25			—
MN	2	N		65.92	11.92	•		partial
MS	3	N		34.74	—			—
MO	2	N		96.42	103.46			No
MT	2	2½ - 5% res. 35% comm.	12/86	43.78	—			No
NE	Public Power	N	12/85	71.83	—			—
NV	1	N		100	—			partial
NH	2	N			76.26			No
NJ	2	N		56.07	—			partial
NM	2	25% res. & comm.	12/89	24.27	87.19			partial
NY	2	N		86.35	7.74	•		partial
NC	2	25% res. & comm.	open-ended	100.50	98.72	•		partial
ND	3	15% res. & comm.	open-ended	26.46	—			short term
OH	2	N		84.82	—			partial
OK	3	55% res./30% comm.	12/90	76.01	—			partial
OR	1	25% res. & 35% comm.	12/89/90	91.54	—			No
PA	2	N		77.80	98.23			partial
RI	3	10% res. & comm.	6/90	72.79	—			No
SC	2	25% res. & comm.	open-ended	50.20	—			partial
SD	3	N		4.54	—	•		No
TN	Public Power	N		79.40	9.13			—
TX	1	N		89.18	—			partial
UT	3	25% res. & comm.	12/90	87.99	107.92			partial
VT	1	N		32.43	—			partial
VA	2	20% res. & comm.	12/86	99.24	73.43			partial
WA	2	N		—	90.23			No
WV	3	N		—	—			partial
WI	1	N		91.92	—	•		partial
WY	3	N		—	—			No

(for more extensive information see Energy Appendix Packet)
(see notes on page 34)

received little support from the federal government and stiff challenges from utility companies and was stalled for five years. Funding for solar technology research and development was slashed from $771 million in 1981 to $176 million in 1986. Federal income tax credits were eliminated for residential purchase of renewable energy equipment in 1985, and business credits were scheduled for phase out. The Residential Conservation Service budget was cut from $9.2 million in 1981 to $400,000 in 1986. Energy conservation funding for institutional buildings was cut from $159 million in 1981 to $52.5 million in 1986. And state energy conservation program funding was cut from $37.2 million to $17.7 million for the same period.[39] The Solar Energy and Energy Conservation Bank was zeroed out of the federal budget. The Department of Energy balked at instituting efficiency standards for appliances mandated by Congress and the President ultimately vetoed a bill for such standards. The Reagan Department of Energy also scaled back the 1979 projection of renewable energy meeting 20 percent of the nation's energy needs to 13 percent.

These policies devastated the fledgling solar and wind industries, and generally undermined state momentum in energy policy-making. As of September 1986, only ten states had passed legislation or adopted regulations to push least-cost energy planning at the state level. And at the end of 1986 five states let solar tax credits expire, with provisions in three more states set for expiration by the end of 1987.

Critics of the Reagan administration maintain that the current oil glut and the 30 percent surplus of electricity in the United States provides an ideal opportunity to make a strong transition to diverse power production, renewable energy sources, and greater energy efficiency during the next decade. The administration, however, maintains its support for traditional energy sources—venturing as far as strategies for a resurgence of nuclear construction in the 1990s.[40]

Several states and individual cities continue to make progress, however. California has seen the most significant development of wind and solar facilities with about 1400 megawatts of wind, 211 megawatts of solar thermal, and 8 megawatts of solar photovoltaic-produced electricity.

In Wisconsin, state energy planners have discovered that the state's forests contain enough wood fuel to supply up close to 30 percent of the state's non-transportation energy needs to the year 2000 and beyond. In addition to their "oil field" in the backwoods, the state utility commission has also ordered utility companies to double their conservation efforts,[41] and is urging utility companies to develop least-cost planning for future energy production. Three states—Massachusetts, California, and Maine—have passed their own appliance efficiency standards. And eight states have formulated building codes which aim at substantially greater energy efficiency for buildings.

Several cities are currently looking at moving beyond piecemeal state conservation planning to more comprehensive models. Austin, Texas which has a nonprofit public power system, has initiated a plan to reduce municipal power demand by 550 megawatts (about 20 percent) by 1997. A similar plan is in the works for New Orleans. And Chicago is examining a variety of options for energy efficiency and alternative power production.[42]

One major difficulty is that electric utilities and other energy suppliers are reluctant to yield their monopoly control and participate in efforts that will mean more competition from diverse small power producers, or energy efficiency that can cut into their growth in sales and profits.

The key to what course events may take rests in large part on price rises in traditional fuels—oil, gas, coal, electricity—and the policy response of federal and state government. In order to move those policies before we encounter a new crisis, institutional changes will be needed. Currently more than two dozen large and small cities are considering replacement of private utility companies that serve them with a nonprofit public system. In other areas, efforts have emerged to improve state regulation of energy companies or replace appointed state regulatory commissioners with elected officials.

Independent power producers are also appealing to state utility commissions to break the monopoly hold private power companies have on electricity generation and allow greater competition in the industry. What the outcome of these efforts will be remains uncertain. But all indications are that the future of renewable energy and energy efficiency and will rely as much on the political decisions at the federal, state and local level as the development of new technologies.

ENERGY SNAPSHOT

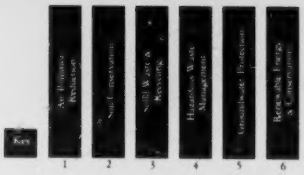
California is widely recognized for its encouragement of renewable energy development. The state has formulated the standards, authority, and regulations to require "least-cost" energy development, and until recently offered substantial tax incentives to independent energy developers. Residential and commercial purchasers of renewable energy systems also have received income tax credit which has helped overcome initial market barriers (residential 10 percent and commercial 25 percent). In addition to such provisions, California has also formulated building codes which require greater energy efficiency, and efficiency standards for a variety of appliances.

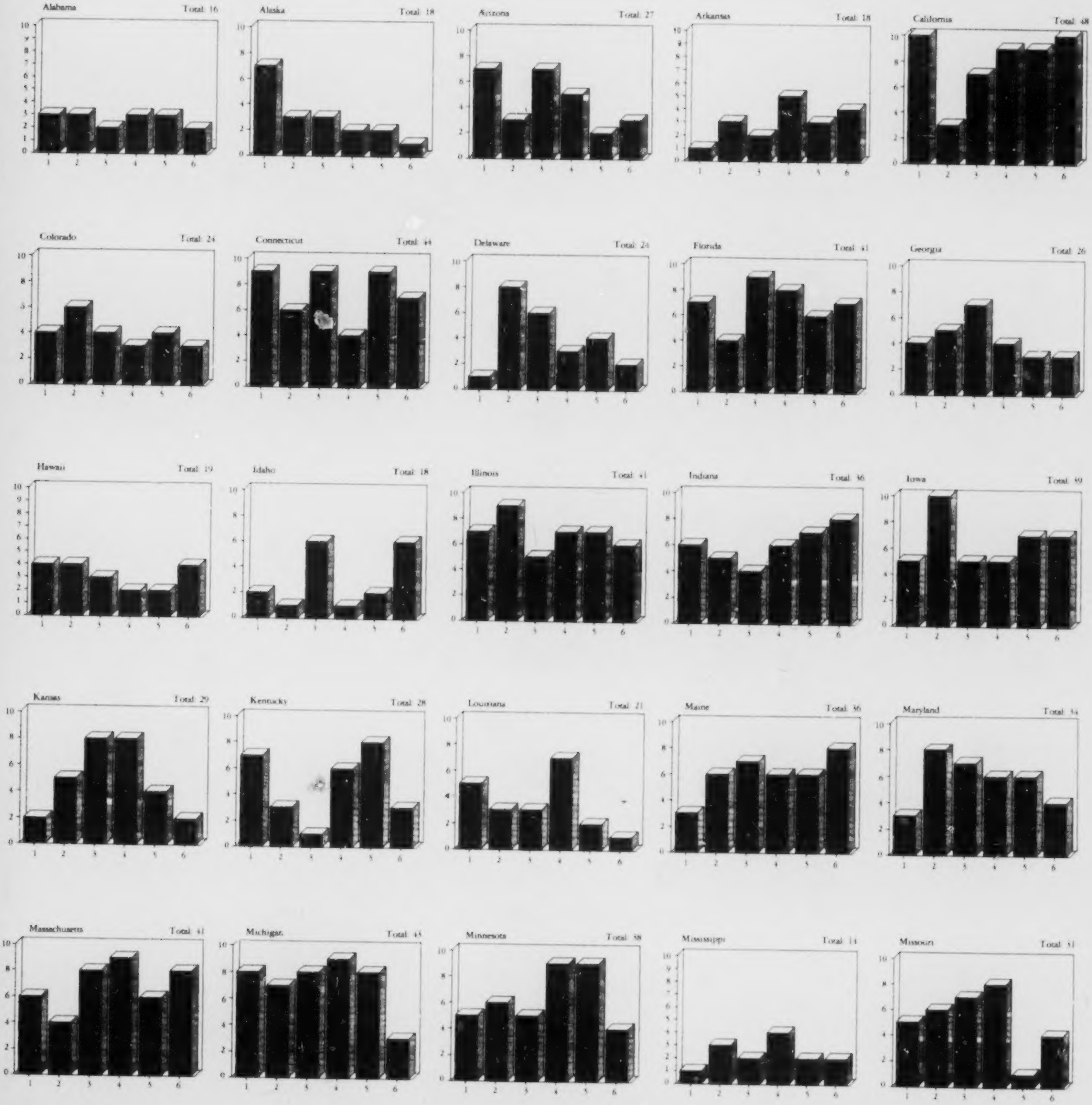
Broadening the use of such policies has run into resistance of temporarily lower fuel prices and federal policies which emphasize boosting traditional energy supply sources, over efficiency measures. Utility and energy companies are also fighting to maintain monopoly control of energy markets and limit competition and efficiency developments that many view as cutting into their growth in sales and profits.

Currently:

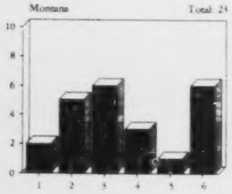
- ten states have developed adequate authority and regulations to mandate least-cost energy planning;
- twenty-four states have offered income tax credits for the purchase of some type of renewable energy equipment;
- tax credits in five states expired December 31, 1985;
- tax credits in three states are set to expire by December 31, 1987;
- fifteen states do not allow construction-work-in-progress charges which have provided automatic funding for utility construction projects;
- three states have passed their own appliance efficiency standards;
- eight states have formulated building codes to substantially improve energy efficiency.

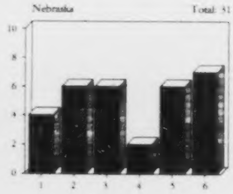
How The States Measure Up

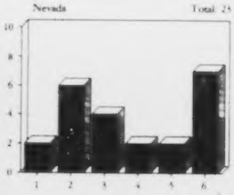


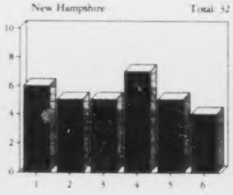


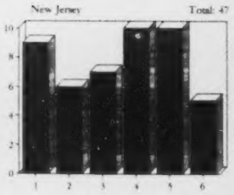
State Ranking Graphs

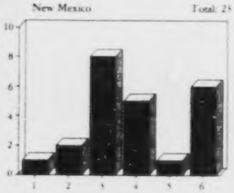


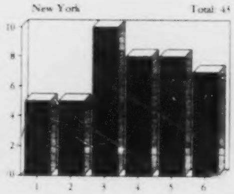


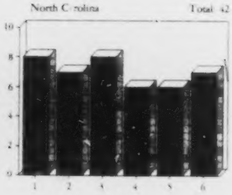


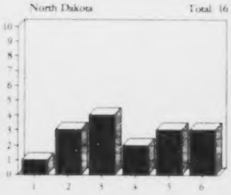


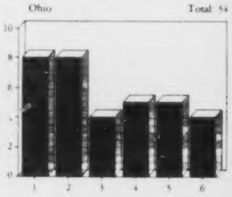


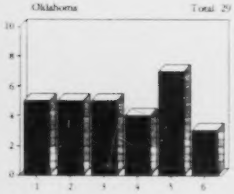


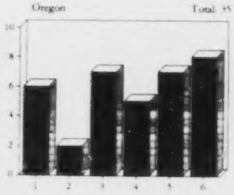


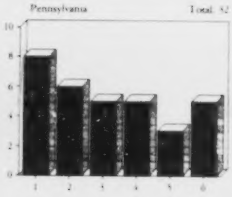


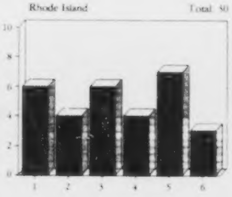


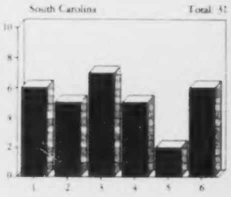


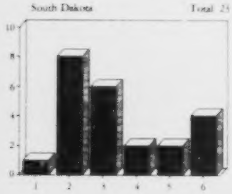


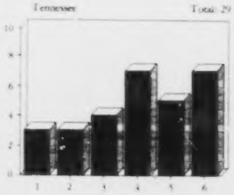


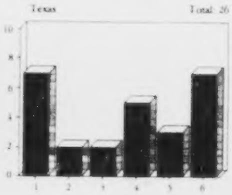


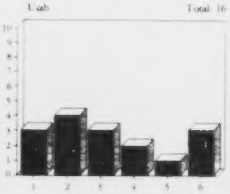


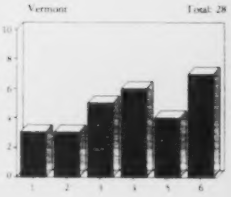


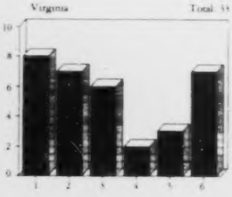


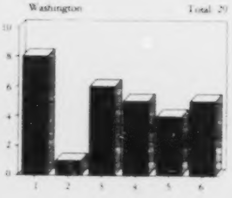


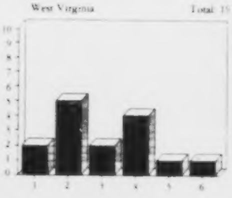


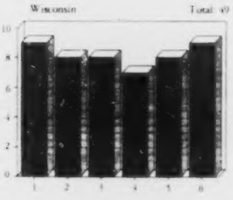


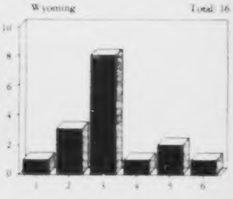












Ranking Notes

States have been ranked on the strength of environmental programs and policies on a scale of one to ten. The total rank is the compilation of points for the six topics examined (potential total of 60 points). The rank is not meant to judge particular environmental conditions in each state, but considers environmental problems as a measure of need for program strength. Key factors weighed against this need are: legislative authority for programs, scope of established programs, extent of funding, monitoring, enforcement, and indications of progress. Although institutionalized programs, rather than innovative projects, are given greater weight—attention is given to assure that states have not simply "papered-over" a problem with new legislation.

In this subjective evaluation, the ranking has a number of shortcomings. For example, the ranking does not address the fact that certain states may be diverting scarce revenues to education, housing, or other badly needed social programs. It also does not address the fact that states with a higher per capita income can divert more funding to environmental issues. And it is dependent on information collected by federal agencies from the state programs.

Key indicators used in the ranking are contained on the matrix pages in this report and in more detailed matrices compiled in appendix packets designed to accompany each topic section. Readers interested in more detailed information on a particular topic, or state ranking for that topic, can request the appropriate appendix packet. (See inside back cover).

Air Pollution

In the final air pollution program rankings attainment/nonattainment status was used as a background against which monitoring, enforcement, legislative, and research activity was judged. Aggressive state programs are those with active total suspended particulate (TSP) and ozone programs; TSP because visible emissions are often the first to be detected and criticized, thereby spurring corrective action, and ozone because it presently constitutes a high priority nationwide problem.

The level of compliance with the federal and/or state regulation was based on the number of deficiencies in the state implementation plans for the criteria pollutants in 1986.

State enforcement activity assessment was based on EPA's Compliance Data System for total enforcement actions. The number of state inspection and notices of violations were considered the best indicators of state enforcement activity. Those sanctions imposed on pollution sources, or violating county or state, as a consequence of deficiencies in the state implementation plan, gave further indication of the presence or lack of state enforcement activity.

Active acid rain and/or toxic pollutant programs were viewed as commitments to move beyond standard air pollution reduction programs. Particular attention was paid to acid rain activity— either state-funded research or control legislation—in those states sensitive to, or contributing heavily to, the problem.

Soil Conservation

The broad background for soil conservation rankings was the amount of tons lost per acre of cropland. Also considered as a broad measure were the percentages of cropland needing erosion control and the amount being tilled with such methods.

Erosion and sediment control laws were seen as essential pieces of soil conservation legislation. Added to this are established soil loss limits and cost-sharing for soil conservation projects. The most effective state programs combined cost-sharing with requirements for approval of land-use plans before soil is disturbed, and adequate enforcement and penalties.

Within the context of a state's erosion problem, and the amount of erosion control undertaken, state and local funds appropriated for soil conservation were considered as indicators of commitment to carry out programs and reduce erosion. Consideration was also made of the states that have seen progress in saving soil between the 1977 and 1982 surveys.

Solid Waste & Recycling

Rankings were based on a number of factors in managing solid waste and reducing the threats of pollution of air, soil, and water by solid waste facilities. Particular attention was given to recycling as the most cost-effective and environmentally benign method of waste management.

Landfill disposal, the traditional waste management strategy, was assessed for enforceable protection requirements and standards. Also considered were the extent and frequency of monitoring programs (including groundwater, surface water, air, and methane monitoring), and the total number of inspections for 1984. These measures were compared to the total number of solid waste landfills and estimated tonnage of solid waste generated by each state.

State recycling programs were ranked according to the extent of legislative and program activity, focusing on both waste reduction incentives and market development. Indicators of a comprehensive recycling program included: mandated waste reduction, litter control legislation, recycling goals as a percentage of the total waste stream, and EPA approved solid waste plan, bottle bills, tax incentives, state grants, landfill surcharges and other fundraising mechanisms, used oil and tire recycling programs, consumer education, and state procurement of recycled products.

Hazardous Waste

The primary indicators of hazardous waste problems were the number of sites on the National Priority List, the number of sites on the Emergency Response and Remedial Investigation List, and the estimated amount of hazardous waste generated. Seven state program initiatives were assessed: state superfund provisions, underground injection controls, final authorization for pre-HSWA programs, small quantity generator regulations more stringent than the federal program requires, community right-to-know laws, incentives to reduce/recycle hazardous wastes, and household hazardous waste collection.

State superfund programs were weighted most heavily in the determination of state rankings. For a state to be considered as having a superfund program separate from EPA's, a statute or statutes must enable the state to assess hazardous waste sites and initiate remedial cleanup actions, and/or empower the state to enforce action by responsible parties when deemed necessary.

Groundwater Protection

The broad indicators of a need for groundwater protection are the amount of groundwater withdrawal per day and the percentage of population served by groundwater. Legislative authority to implement a strategy plan and the existence of a plan were considered essential to progress. Added to this are programs for mapping, groundwater quality standards with more than two categories, and state policies for controlled land-use areas. The strongest state programs allowed for a variety of monitoring at suspected contamination sites, had well-integrated state and local programs, and advocated non-degradation or limited degredation of groundwater supplies.

Consideration was also made of the existence or extent of laws and regulations addressing leaking underground storage tanks.

Renewable Energy and Conservation

State energy rankings were based on the fact that every city and state must undertake comprehensive energy planning. The emphasis was on states which are attempting to institutionalize energy efficiency into building codes, tax structures, and regulatory policies. Primary consideration was given to states which have formulated comprehensive laws for "least-cost" energy planning. The formulation of tax credits for solar and renewable energy systems, and the utilization of grants and loans from the Solar Energy and Energy Conservation Bank were also assessed as signs of a state's interest and ability to support vital technological progress and savings of fossil fuels.

In addition to these primary indicators, assessment was also made of state policies which allow construction-work-in-progress charges that have encouraged overbuilding of centralized energy systems and undermined renewable energy and energy efficiency development.

Matrix Notes

The matrix for each topic section of this main report is condensed from several matrices on each topic contained in the corresponding appendix packet. The notes below describe the topic headings, numerical assessments given to the comprehensiveness of various programs and policies, and the sources of information.

Air Matrix

1. SIP signifies State Implementation Plan. SIP deficiencies include both major and minor inadequacies in the state's plan for controlling sources and pollutant levels. (source: US EPA, *Actions on Deficient SIPs and Other Nonattainment SIPs*, in-house data base, Office of Air and Radiation, Washington, DC, 1986).

2. "Designated areas" are areas designated for air quality planning purposes. Criteria pollutants include:
C= Carbon Monoxide
N= Nitrogen oxides
S= Sulfur oxides
O= Ozone
T= TSP (particulate matter evaluated in terms of total suspended particulates, TSP)
(source: *Code of Federal Regulations*, Office of the Federal Registrar, Washington, DC, Number 40, Parts 81 to 99, 1985).

3. Total Monitors includes monitors from both the National Air Monitoring Network System (NAMS), and the State and Local Air Monitoring Network System (SLAMS). (source: State and Territorial Air Pollution Program Administrators, "FY85 State Funding Surveys," unpublished, Washington, DC, April, 1984).

4. Total enforcement actions includes notices of violation, inspections, source tests, warning letters, etc. (source: US EPA, "Enforcement Actions and the 1986 Air Quality Attainment/Nonattainment Status," EPA Compliance Data System, Washington, DC, 1986).

5. See text for an explanation of appropriate sanctions. (source: US EPA, *Actions on Deficient SIPs and Other Nonattainment SIPs*, in-house database, Office of Air and Radiation, Washington, DC, 1986).

Soil Conservation Matrix

1. Statewide conservation programs are fundamental to soil conservation. (source of data: Eugene Lamb, Program Analyst, National Association of Conservation Districts, Washington, DC, August 1986)

2. Erosion and sediment control laws, soil loss limits, and other state provisions are the next stage of soil conservation policy. (source of data: "Summary of Principal Provisions of State Laws Providing for Erosion and Sediment Control," prepared by Mary Gardner, National Association of Conservation Districts, Washington, DC, July 1985).

3. Sheet and rill erosion are the primary types of damage to cropland soil. (source of data: USDA, National Resources Inventory, Washington, DC, 1982)

4. Figures on soil requiring conservation tillage are from: National Survey of Conservation Tillage, Washington, DC, 1983

5. Figures on funds appropriated are from: USDA, Agricultural Statistics, Washington, DC, 1985

Solid Waste Matrix

1. Solid waste management data as of June 1986. Symbols mean:
1= EPA approved
2= EPA partially approved
3= adopted plans and submitted them for EPA review
4= drafts of state plan are under state or EPA review
5= has not submitted a plan
(source: US EPA, State Programs Branch, Office of Solid Waste, Washington, DC, 1986).

2. Landfill regulations symbols mean:
1= examination of 31 specified landfill requirements: all or most requirements were explicitly included in state regulations
2= approximately half the 31 requirements are specifically included under state regulations with a few requirements not enforceable under any policies.
3= few requirements are specifically included in state legislation, though all or most are enforceable under general standards and policies.

4= almost no enforceable requirements (source: US EPA, "State Subtitle D Program Questionnaires," unpublished, Office of Solid Waste, Washington, DC, 1986).

3. Recycling program symbols mean:

1= the most comprehensive recycling programs with respect to state funding, market development and mandating waste reduction. New York's and Pennsylvania's proposed programs are included in this category.

2= state funded programs with an emphasis on recycling legislation and market development.

3= state programs with zero or limited funding but nevertheless have taken a step, or several steps, towards reducing litter, and/or developing markets for recycled products.

4= state programs with zero or limited funding that restrict efforts to some state purchase of recycled paper, a recycling hotline, etc., or leave recycling to the private sector.

(source: information gathered primarily from back issues of *Resource Recycling*, and *Biocycle* magazines).

4. Frequency of inspections represents the frequency with which 60 percent of the landfills are inspected in each state. " < " = less than; " > " = greater than. (source: US EPA, "State Subtitle D Program Questionnaires," unpublished, Office of Solid Waste, Washington, DC, 1986).

5. State solid waste tonnage is based on 3.5 pounds per person per day multiplied by state population.

Hazardous Waste Matrix

1. State superfund is defined by statutes authorizing a state to assess hazardous waste sites and to initiate remedial clean-up actions, and/or to enforce assessment by responsible parties when deemed necessary. States which have this authority and do not actively exercise it, are not included on the matrix. (source: phone conversations with individual state officials).

2. Small quantity generator regulations that are more stringent than the federal standards that took effect on September 22, 1986. (source: phone conversations with regional EPAs).

3. Pre-HSWA final authorizaton includes states which fulfilled requirements of the 1976 Resource Conservation and Recovery Act (RCRA) set forth prior to the Hazardous and Solid Waste (HSWA) amendments of 1984. (source: US EPA, "States Granted Final Authorization for Pre-HSWA Program as of May 15, 1986, Office of Solid Waste, Washington, DC, 1986).

4. Right-to-know laws usually address hazardous materials, not hazardous waste, but serve nevertheless as a measure of a state's responsiveness to the role and rights of local communities. (source: "Hazardous Waste News," Thompson Publishing Group, Washington, DC, May, 1986, Vol. III, pp. 3-6).

5. Incentives to reduce/recycle hazardous wastes are classified as financial, institutional, and other. For individual state incentives to reduce/recycle hazardous waste, see the appendix on hazardous waste. (source: *Hazardous Waste Management: A Survey of State Legislation, 1982*, prepared by National Conference of State Legislatures, Denver, Colorado, 1982).

6. Household hazardous waste program symbols mean:

S signifies Statewide

C/L signifies County or Local level

These programs may be ongoing, annual or one-time events.
(source: "Overview of Nationwide Small Quantity Generator and Household Hazardous Waste Collection Programs," prepared by Linda Dunphy, Environmental Task Force, Washington, DC, March, 1986).

7. Emergency Response and Remedial Information System (ERRIS). (source: National Campaign Against Toxic Hazards, Washington, DC, 1986).

8. Source of hazardous waste generation ranking: EPA contractor study, noted in *The Toxic Substances Dilemma*, National Wildlife Federation, Washington, DC, 1980), p.79.

Groundwater Protection Matrix

1. Legislative authority to implement a groundwater strategy plan is one of the most fundamental measures a state can undertake. (source of state breakdown: Association of State and Interstate Water Pollution Control Administrators, Washington, DC, America's Clean Water—the States' Nonpoint Assessment, 1985)

2. Leaking underground storage tank legislation information is from US EPA, Office of Underground Storage Tanks, Washington, DC, 1986).

3. Nondegradation policy information is from: ASIWPCA, 1985.

4. Monitoring information is from: US EPA, Office of Groundwater Protection, Washington, DC, State Groundwater Summaries, Vol 2, 1985.

5. Figures on groundwater consumption and withdrawal are from: USGS National Water Summary, Washington, DC, 1984.

Renewable Energy and Conservation Matrix

1. Least-cost energy policies of the states were examined by Public Citizen's Critical Mass Energy Project in 1985. The numerical assessment is based on their evaluation of progress of a state toward a comprehensive model for least-cost energy strategies

1= comprehensive regulatory authority and policies in place which require integrated planning and investment process for utilities.

2= state has made some progress toward least-cost planning process and has some control over utility investment

3= state has made little progress in implementing policies and authority to encourage least-cost strategies

(source: Critical Mass Energy Project, Least-cost Electrical Planning: Is There Really a State Movement?, Washington, DC, Dec. 1985).

2. This column addresses state income tax credits only, not rebates or sales tax exemption. Policies for income tax exemption vary widely, but following federal legislation, general trend is to let state credits expire.

N= signifies no income tax credits available

(source: Solar Rating and Certification Association, State Solar Directory, Washington, DC, 1985, and personal communication with state officials).

3. More than 80 percent of the total funding for the federal Solar Energy and Energy Conservation bank was applied to conservation and not solar measures. (source of data: Solar Energy and Energy Conservation Bank, data printout, Washington, DC, July 1986).

4. Although many states have minimal requirements for energy efficiency in new buildings, those with the most substantial standards are included here. (source: National Conference of States on Building Codes and Standards, Herndon, Virginia).

5. Many states are also formulating appliance efficiency standards, in the absence of a federal law, however, only three states currently have such laws. (source: American Council for an Energy-Efficient Economy, Washington, D.C.)

6. State regulatory policies play an important role in energy development. Construction-work-in-progress charges have been a primary mechanism which allowed the overbuilding of electric generating plants in the 1970s and early 1980s— encourging centralized energy development—wasting energy capital and resources, and undermining the growth of renewable energy technologies. (source of CWIP breakdowns: Solomon Brothers, Electric Utility Regulation—Semiannual Review, New York, New York, February 1986).

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8. Marc Leepson, "Soil Erosion: Threat to Food Supply," *Congressional Quarterly*, vol. 1, no. 12, 1984.

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13. "Illinois," *Conservation Focus*, vol. 1, no. 7, September 1984.

14. Ward Sinclair, "Soil Conservation and Budget Erosion," *Washington Post*, December 12, 1986, p. A21.

Solid Waste and Recycling

15. The waste composition breakdown is from: "Characterization of Municipal Solid Waste in the United States 1960 to 2000," (prepared as part of a report to be issued by US EPA in 1987), Franklin Associates Ltd. The breakdown for the amount of waste recycled, landfilled or incinerated is from personal communication with Neil Seldman, Institute for Local Self-Reliance, Washington, D.C.

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19. *Solid Waste Management Plan Draft Update 1985-2000*, New Jersey Department of Environmental Protection, Division of Solid Waste Management, 1985.

Hazardous Waste Management

21. Personal communication with Joel Hirshhorn, Office of Technology Assessment.

22. Joel Hirschhorn, OTA.

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Additional Sources of Information

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APPENDIX

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Introduction

The Air Pollution Appendix is one of six appendices designed to supplement the data presented in the 1987 State of the States report. It has been compiled with various goals in mind: to provide detailed, comprehensive, and current data on the status of the fifty state air quality control programs, to contribute to networking activities and information sharing, and to add to constructive debate on critical environmental policy questions.

Information from the main report--state rankings, primary map, brief text, and primary matrix--are presented in the forward section of the packet. Additional matrix information and maps as well as national air program contacts are also included.

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  Acid Rain: Soil Sensitivity and Acidity of Precipitation
  Non-Attaining Counties for Sulphur Dioxide--1985
  Non-Attaining Counties for Ozone--1985
  Non-Attaining Counties for Carbon Monoxide--1985
  Non-Attaining Counties for Nitrogen Dioxide--1985

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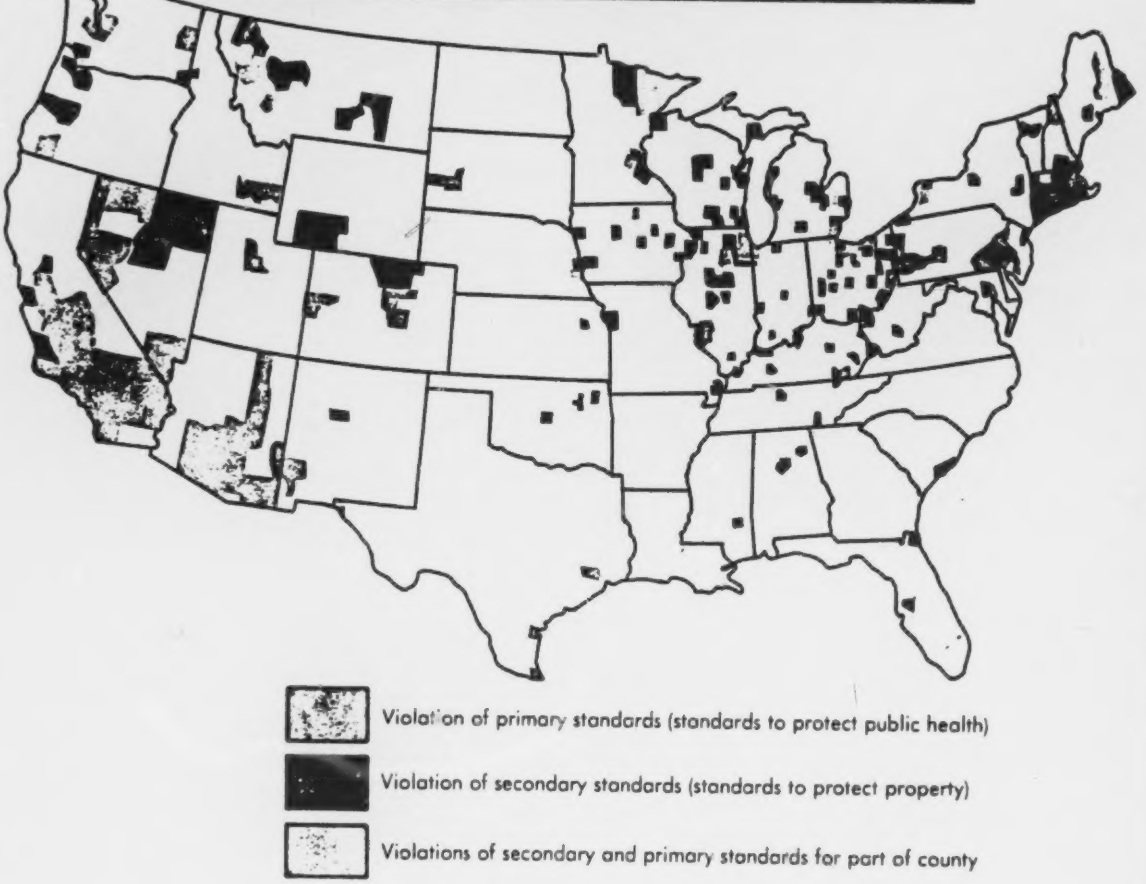
STATE ABBREVIATIONS

AL	ALABAMA
AK	ALASKA
AZ	ARIZONA
AR	ARKANSAS
CA	CALIFORNIA
CO	COLORADO
CT	CONNECTICUT
DE	DELAWARE
FL	FLORIDA
GA	GEORGIA
HI	HAWAII
ID	IDAHO
IL	ILLINOIS
IN	INDIANA
IA	IOWA
KS	KANSAS
KY	KENTUCKY
LA	LOUISIANA
ME	MAINE
MA	MASSACHUSETTS
MI	MICHIGAN
MN	MINNESOTA
MS	MISSISSIPPI
MO	MISSOURI
MT	MONTANA
NE	NEBRASKA
NV	NEVADA
NH	NEW HAMPSHIRE
NJ	NEW JERSEY
NM	NEW MEXICO
NY	NEW YORK
NC	NORTH CAROLINA
ND	NORTH DAKOTA
OH	OHIO
OK	OKLAHOMA
OR	OREGON
PA	PENNSYLVANIA
RI	RHODE ISLAND
SC	SOUTH CAROLINA
SD	SOUTH DAKOTA
TN	TENNESSEE
TX	TEXAS
UT	UTAH
VT	VERMONT
VA	VIRGINIA
WA	WASHINGTON
WV	WEST VIRGINIA
WI	WISCONSIN
WY	WYOMING

STATE PROGRAM RANKINGS: HOW STATES MEASURE UP

	AIR PROGRAMS	SOIL CONSERVATION PROGRAMS	GROUNDWATER PROGRAMS	HAZARDOUS WASTE PROGRAMS	SOLID WASTE PROGRAMS	RENEWABLE ENERGY & ENERGY CONSERVATION	TOTAL	RANK
AL	3	3	2	3	3	2	16	26
AK	7	3	3	2	2	1	18	25
AZ	7	3	7	5	2	3	27	19
AR	1	3	2	5	3	4	18	25
CA	10	3	7	9	9	10	48	2
CO	4	6	4	3	4	3	24	21
CT	9	6	9	4	9	7	44	4
DE	1	8	6	3	4	2	24	21
FL	7	4	9	8	6	7	41	7
GA	4	5	7	4	3	3	26	20
HI	4	4	3	2	2	4	19	24
ID	2	1	6	1	2	6	18	25
IL	7	9	5	7	7	6	41	7
IN	6	5	4	6	7	8	36	10
IA	5	10	5	5	7	7	39	8
KS	2	5	8	8	4	2	29	17
KY	7	3	1	6	8	3	28	18
LA	5	3	3	7	2	1	21	23
ME	3	6	7	6	6	8	36	10
MD	3	8	7	6	6	4	34	12
MA	6	4	8	9	6	8	41	7
MI	8	7	8	9	8	3	43	5
MN	5	6	5	9	9	4	38	9
MS	1	3	2	4	2	2	14	28
MO	5	6	7	8	1	4	31	15
MT	2	5	6	3	1	6	23	22
NE	4	6	6	2	6	7	31	15
NV	2	6	4	2	2	7	23	22
NH	6	5	5	7	5	4	32	14
NJ	9	6	7	10	10	5	47	3
NM	1	2	8	5	1	6	23	22
NY	5	5	10	8	8	7	43	5
NC	8	7	8	6	6	7	42	6
ND	1	3	4	2	3	3	16	26
OH	8	8	4	5	5	4	34	12
OK	5	5	5	4	7	3	29	17
OR	6	2	7	5	7	8	35	11
PA	8	6	5	5	3	5	32	14
RI	6	4	6	4	7	3	30	16
SC	6	5	7	5	2	6	31	15
SD	1	8	6	2	2	4	23	22
TN	3	3	4	7	5	7	29	17
TX	7	2	2	5	3	7	26	20
UT	3	4	3	2	1	3	16	26
VT	3	3	5	6	4	7	28	18
VA	8	7	6	2	3	7	33	13
WA	8	1	6	5	5	3	29	17
WV	2	5	2	4	1	1	15	27
WI	9	8	8	7	8	9	49	1
WY	1	3	8	1	2	1	16	26

COUNTIES THAT VIOLATE STANDARDS FOR SUSPENDED PARTICULATES (ASH, DUST, ETC.)


Violation of primary standards (standards to protect public health)
Violation of secondary standards (standards to protect property)
Violations of secondary and primary standards for part of county

Data for September, 1985   SOURCE: EPA

AIR POLLUTION REDUCTION--THE BIG PICTURE

Much of the more visible pollution once discharged into the air is now gone--the primary reason for this progress is the federal Clean Air Act. First passed in 1963, the Clean Air Act set up a partnership between the federal and state governments to reduce air pollution. Amendments passed in 1970 put teeth into the law. The new Environmental Protection Agency was directed to adopt National Ambient Air Quality Standards for major pollutants. States were to develop State Implementation Plans (SIPs) to detail how they would meet the standards.

Seven major pollutants were targeted for reduction: particulates (ash, dust, etc.), sulphur oxides, nitrogen oxides, carbon monoxide, hydrocarbons,* ozone, and later lead. The law required that primary standards to protect public health be met by 1975. Secondary standards to protect property were given extended deadlines.

By 1975 it was apparent that the reduction goals were not going to be met. After heated debate, Congress passed a new set of amendments to the Clean Air Act in 1977. If the amendments in 1970 had teeth, those passed in 1977 offered a convincing bite. New deadlines were set to achieve health related reductions in pollution by December 31, 1982. Attainment of standards for ozone pollution or severe carbon monoxide problems were targeted for December 31, 1987. The secondary standards to protect property were to be met "as expeditiously as possible."

In order to assure that states would take these deadlines seriously, economic sanctions were put in place. Any state which had a nonattainment area was required to submit a new implementation plan. If the plan was not submitted and approved by July 1, 1979, construction of new industrial sources of air pollution could be prohibited and federal funds for highways, housing and sewage treatment plants could be withheld. Courts were also given authority to enforce any sanctions, if EPA failed to do so.

Between 1975 and 1984 ambient levels of total suspended particulates were reduced by 20 percent by mass. But in 1984, particulate emissions increased 4 percent and ambient levels increased 2 percent. Sulphur dioxide, which contributes to acid rain and can cause respiratory damage also increased two percent between 1983 and 1984 after a decline in ambient levels of 36 percent. Carbon monoxide levels which had declined 34 percent between 1975 and 1984, decreased only 1 percent in 1984. Nitrogen dioxide which contributes to pneumonia and bronchitis increased from 1975 to 1979, decreased through 1983, and increased slightly in 1984. Ozone levels which had decreased 17 percent appeared to remain even in 1984. And ambient levels of lead--which can cause irreversible damage to the brain, kidneys, nervous system, and circulatory system--decreased 70 percent at 36 urban sites from 1975 to 1984, and between 1983 and 1984 declined 7 percent.

Although reduction of the major criteria pollutants remains the cornerstone of air pollution control, newly discovered air pollution problems are demanding attention in every state.

How much work the states will be able to take on with new air pollution problems remains uncertain. The partial success in meeting goals established by the Clean Air Act may foretell the future for new expensive air programs.

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* Ambient guidelines were originally set for hydrocarbons but have since been neglected by all but a few state and local monitoring sections due to poor instrumentation and lack of EPA's authority to enforce the guidelines.

The general indications are that the stall in progress could be lengthy. At least seven states reduced their air program budgets in 1985 and the federal government effectively froze its contributions. State and local agency grants totaled $94.3 million in 1981 and $96.3 million in 1986, and cutbacks in air monitoring and research already reflect the negative impacts this trend is having on state air program activities.

At the same time, however, an unprecedented growth in public concern for the environment offers some hope for progress amidst this stall in air pollution control. While a decreased federal role in air management severely hinders many state budgets, the opportunity for increased pressures and greater control at the state and local levels may provide incentives to bring environmental protection into the forefront of state policy concerns

AIR PROGRAM SNAPSHOT

California offers the best working model for air pollution reduction policies and programs. The program combines a state Air Resources Board made up of technical experts and representatives of 44 county and regional air quality agencies. The local agencies are primarily responsible for controlling emissions of industrial facilities and the board provides financial and technical expertise and assists in the enforcement of standards. The board also oversees a research program second in size only to the federal EPA.

In addition to integrated work at the state and local levels, federal support is essential in resolving regional problems such as acid rain, or participating in international efforts to curb global problems with carbon dioxide pollution or ozone depletion. Energy, manufacturing and transportation industries also need to play a vital role in funding research, monitoring, and pollution reduction programs.

RANKING NOTES

The focus of this state air program review has been the emissions reduction for six air pollutants outlined in the Clean Air Act of 1970. The criteria pollutants include particulates, sulphur dioxide, nitrogen dioxide, carbon monoxide, ozone and lead. While the majority of air quality standards are formulated on the federal level and the issue of air pollution continues to be a national problem, states have a strong role to play in the implementation and enforcement of the federal standards. Opportunity also exists for states to go beyond federal legislation when specific problems require immediate attention and the federal government is slow to respond, as in the case of acid rain and toxic air pollution.

States were ranked on a scale of one to ten on the strength of their environmental policies. The rank is not meant to judge particular environmental conditions in each state, but considers environmental problems as a need for program strength. Program initiatives weighed against this need include the extent of the monitoring network for the criteria pollutants within each state, implementation strategies, enforcement actions, legislative initiative, funding levels, and program innovation. The attainment or nonattainment status of the criteria pollutants* within each state gave the most direct measure of the extent of the air pollution problem. And a state's overall air quality served as a background against which state policy actions were considered.

Summary of State Air Pollution Reduction Activity

o thirty-four states have deficient implementation plans (SIPs) in one or more counties.

o EPA has imposed sanctions on twenty-one states as a consequence of SIP deficiencies;

o six states have passed legislation addressing acid rain control (no federal acid rain law has been passed);

o twenty-nine states are conducting acid rain research;

o twenty states have initiated regulatory programs in the newly emerging field of toxic air pollutants;

o as of July 1985:
  * Thirty-seven states exceeded the primary standard for CO
  * two states exceeded the primary standard for NOx
  * eighteen state exceeded the primary standard for SO2
  * thirty-five states exceeded the primary standard for O3
  * thirty-four states exceeded the primary standard for TSP

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* EPA opposes designating a status of attainment or nonattainment of the National Ambient Air Quality Standards for lead.

AIR MATRIX

	NUMBER OF COUNTIES WITH SIP DEFICIENCIES 1986	CRITERIA POLLUTANTS EXCEEDING PRIMARY STANDARDS IN ONE OR MORE DESIGNATED AREA	TOTAL NUMBER OF MONITORS FOR CRITERIA POLLUTANTS	TOTAL ENFORCEMENT ACTIONS	EPA SANCTIONS IMPOSED AS CONSEQUENCE FOR SIP DEFICIENCIES	TOXIC POLLUTANT CONTROL PROGRAM IN PLACE	ACID DEPOSITION CONTROL PROGRAM IN PLACE	CONDUCTS RESEARCH ON ACID RAIN	1985 TOTAL AIR PROGRAM BUDGET	1982 TOTAL AIR PROGRAM BUDGET
AL	4	S,O,T	54	1,365	●	●		●	$2,034,531	$ 1,735,000
AK		C,	37	250				●	949,000	—
AZ	17	C,S,O,T,	78	467	●	●			1,742,200	1,433,300
AR			37	691		●			961,011	1,120,028
CA	35	C,N,O,T,	455	3970	●	●		●	47,879,000	56,406,000
CO	6	C,O,T,	107	470					4,382,000	3,313,000
CT		C,O,	120	1,196		●		●	4,133,820	—
DE		O,	31	177					1,083,962	—
FL	4	S,O,	250	822					3,903,501	—
GA	1	C,O,	23	2,797		●			2,744,943	2,406,633
HI		S,T,	27	142	●				871,000	752,000
ID		C,T,	24	531					691,000	—
IL	28	C,S,O,T,	213	4,892	●	●		●	4,871,600	5,033,600
IN	24	C,S,O,T,	119	2,220	●			●	4,209,137	3,661,181
IA	4	C,T,	86	1,923	●			●	1,031,050	1,178,042
KS	3	C,O,T,	31	2,695					988,428	—
KY	17	C,S,O,T,	184	1,700	●			●	3,167,100	3,355,900
LA	1	O,	66	2,399					3,482,000	2,960,000
ME		S,O,T,	127	533				●	948,700	763,400
MD		C,O,T,	110	646				●	3,318,161	2,194,808
MA		C,O,	99	2,053			●	●	4,814,000	3,967,000
MI	1	C,O,T,	161	1,853		●	●	●	4,557,100	4,627,100
MN	14	C,S,T,	70	1,087	●	●	●	●	2,677,131	—
MS		T,	28	687		●			1,121,000	1,108,334
MO	9	C,O,T,	139	1,442	●			●	2,870,900	—
MT	2	C,S,T,	111	181	●				870,000	797,000
NE	2	C,T,	74	2,696	●				359,852	270,481
NV	2	C,S,O,T,	38	210	●	●		●	536,553	445,821
NH	1	C,O,T,	68	278			●		792,488	—
NJ	18	C,O,	193	2,055		●		●	7,699,056	6,943,480
NM	1	C,S,T,	78	474	●			●	1,754,600	1,557,000
NY	3	C,O,T,	254	4,047	●	●	●		11,800,000	8,700,000
NC	2	C,O,	124	1,746				●	2,870,288	2,551,912
ND			43	235				●	820,399	916,956
OH	34	C,S,O,T,	390	3,869	●	n/a		●	4,453,278	3,786,921
OK	2	C,O,T,	95	702					1,917,169	1,739,000
OR	1	C,O,T,	37	948	●	●			6,377,000	6,084,000
PA	3	C,S,O,T,	223	3159		●		●	6,179,000	6,356,000
RI		C,O,	33	182				●	893,499	880,000
SC		C,O,	85	2,671		●			2,581,874	1,968,395
SD	1	T,	39	212				●	287,817	152,966
TN	2	C,N,S,O,T,	19	1,434	●	●		●	2,194,100	—
TX	8	C,O,T,	211	3,596	●	●		●	14,046,001	14,324,413
UT	1	C,S,O,T,	45	874	●				1,522,445	1,299,000
VT			13	132					606,752	618,000
VA	2	C,O,	153	1,381		●		●	4,886,557	4,571,083
WA	1	C,O,T,	131	627		●		●	1,629,620	—
WV		S,T,	77	538				●	1,710,535	—
WI	•	C,S,O,T,	159	1,749	●		●	●	3,837,000	3,272,000
WY			23	798					994,000	920,000

• has a statewide SIP deficiency for sulphur dioxide

FOOTNOTES TO THE AIR MATRIX

[1] SIP signifies State Implementation Plan. SIP deficiencies include both major and minor inadequacies in the state's plan for controlling sources and pollutant levels.
(source: US EPA, Actions on Deficient SIPs and Other NOnattainment SIPs, in-house data base, Office of Air and Radiation, Washington, DC, 1986).

[2] "Designated areas" are areas designated for air quality planning purposes. Criteria pollutants include:

C=Carbon Monoxide
N=Nitrogen oxides
S=Sulfur oxides
O=Ozone
T=~~TSP~~ (particulate matter evaluated in terms of total suspended particulates, TSP)

(source: Code of Dederal Regulations, Office of the Federal Registrar, Washington, DC, Number 40, Parts 81 to 99,1985).

[3] Includes monitors from both the National Air Monitoring Network System (NAMS), and the State and Local Air Monitoring Network System (SLAMS).
(source: "FY85 State Funding Surveys," an unpublished report by the State and Territorial Air Pollution Program Administrators, Washington, DC, April 1984).

[4] Includes notices of violation, inspections, source tests, warning letters, etc.
(source: US EPA, "Enforcement Actions and the 1986 Air Quality Attainment/Nonattainment Status," EPA Compliance Data System, Washington, DC, 1986).

[5] See text for an explanation of appropriate sanctions.
(source: US EPA, actions on Deficient SIPs and Other Nonattainment SIPs, in-house database, Office of Air and Radiation, Washington, DC, 1986).

STATE AIR PROGRAM BUDGETS

TABLE I

STATE	FY85 FEDERAL APPROPRIATIONS	FY85 STATE APPROPRIATIONS	PERCENT FEDERAL	PERCENT STATE	PERCENT OTHER	FY82 FEDERAL APPROPRIATIONS	FY82 STATE APPROPRIATIONS
AL	1,093,000	942,000	53.7	46.3		1,045,000	697,000
AK	N/A	N/A	N/A	N/A		N/A	N/A
AZ	731,917	1,010,283	42.0	58.0		679,300	754,000
AR	488,750	472,261	50.9	49.1		600,000	520,000
CA	2,873,000	44,568,000	6.0	93.1		2,072,000	52,884,000
CO	1,284,000	3,099,000	29.3	70.7		1,070,000	2,402,000
CT	1,975,000	N/A	N/A	N/A		N/A	N/A
DE	610,810	N/A	N/A	N/A		N/A	N/A
FL	858,717	N/A	N/A	N/A		N/A	N/A
GA	1,108,000	1,636,943	40.4	59.6		1,081,000	1,325,633
HI	362,000	509,000	41.6	58.4		440,000	312,000
ID	491,300	199,700	71.1	28.9		N/A	N/A
IL	3,478,600	1,355,400	71.4	27.8		3,902,200	1,170,400
IN	2,572,774	1,476,288	63.5	36.5		2,073,327	1,587,854
IA	740,000	281,050	71.8	27.3		896,992	281,050
KS	N/A	N/A	N/A	N/A		N/A	N/A
KY	1,180,200	1,623,200	37.3	51.3	11.5	1,229,200	1,774,800
LA	1,500,750	765,278	43.1	22.0	34.9	1,400,000	1,043,000
ME	493,900	454,800	52.1	47.9		469,100	294,300
MD	1,781,572	1,506,387	53.7	45.4		1,902,884	1,028,459
MA	2,600,000	2,214,000	54.0	46.0		2,539,000	1,428,000
MI	2,098,100	2,459,000	46.0	54.0		1,537,800	3,089,300
MN	1,318,607	N/A	N/A	N/A		N/A	N/A
MS	665,000	456,000	59.3	40.7		665,000	443,334
MO	N/A	N/A	N/A	N/A		N/A	N/A
MT	550,000	320,000	63.2	36.8		550,000	247,000
NE	269,889	85,963	75.0	23.9		183,877	86,594
NV	259,890	276,663	48.4	51.6		250,292	195,529
NH	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NJ	3,349,555	4,349,501	43.5	56.5		3,100,000	3,843,489
NM	879,000	875,600	50.1	49.9		950,000	607,000
NY	5,800,000	6,000,000	49.2	50.8		6,300,000	2,400,000
NC	1,480,234	1,307,792	51.6	45.6	2.9	1,415,435	1,136,477
ND	441,000	311,320	53.8	37.9	8.3	446,000	423,578
OH	1,724,935	2,728,343	38.7	61.3		1,315,240	2,471,681
OK	1,200,000	433,169	62.6	22.6	14.8	1,100,000	385,000
OR	1,827,000	1,539,000	28.6	24.1	47.2	1,756,000	1,407,000
PA	3,124,000	3,055,000	50.6	49.4		2,902,000	3,454,000
RI	650,999	242,500	72.9	27.1		660,000	220,000
SC	1,000,000	1,581,894	38.7	61.3		1,009,657	958,738
SD	215,863	71,954	75.0	25.0		114,725	38,241
TN	1,048,600	1,137,200	47.8	51.8	.4	N/A	N/A
TX	3,429,100	10,616,901	24.4	75.6		3,990,262	10,334,151
UT	1,052,919	469,526	69.2	30.8		940,476	358,000
VT	440,000	166,752	72.5	27.5		464,000	154,000
VA	2,241,150	2,645,407	45.9	54.1		2,326,289	2,244,794
WA	768,000	861,620	47.1	52.9		N/A	N/A
WV	N/A	N/A	N/A	N/A		N/A	N/A
WI	1,727,000	1,828,000	45.0	47.6	7.3	1,597,000	1,665,000
WY	457,000	537,000	46.0	54.0		438,000	482,000

STATE AIR MONITORING NETWORKS AND ENFORCEMENT ACTIONS

TABLE II

STATE	CO MONITORS	NOx MONITORS	SO2 MONITORS	OZONE MONITORS	LEAD MONITORS*	TSP MONITORS	STATE NOTICES OF VIOLATION FY1985	STATE INSPECTIONS FY1985
AL	N/A	0	2	8	43	1	583	23
AK	7	1	3	1	22	3	67	9
AZ	9	2	16	9	42	N/A	267	2
AR	N/A	1	2	2	30	2	249	19
CA	78	75	58	116	128	*	2,787	240
CO		4	2	11	78	12	362	6
CT	5	3	15	10	40	46	406	126
DE	2	2	8	5	12	2	91	0
FL	N/A	N/A	N/A	N/A	N/A	N/A	479	4
GA	4	2	11	4	N/A	2	1,263	37
HI	N/A	1	10	2	12	2	116	0
ID	2	N/A	2	N/A	20	N/A	143	21
IL	14	11	30	38	101	19	3,218	4
IN	N/A	3	14	17	85	*	628	36
IA	N/A	N/A	N/A	N/A	N/A	N/A	328	1
KS	N/A	N/A	N/A	N/A	N/A	N/A	493	4
KY	12	8	12	28	124	*	893	111
LA	3	4	6	16	33	4	931	30
ME	1	1	39	6	71	9	171	11
MD	N/A	8	13	23	60	6	481	4
MA	9	8	29	15	32	6	367	35
MI	N/A	7	15	18	121	*	1,000	1
MN	N/A	N/A	N/A	N/A	N/A	N/A	434	49
MS	N/A	N/A	N/A	N/A	N/A	N/A	217	15
MO	12	14	19	19	54	21	711	2
MT	N/A	6	13	6	79	7	115	2
NE	6	3	4	5	56	*	916	2
NV	3	2	1	2	14	14	148	1
NH	2	0	20	6	30	10	144	7
NJ	35	14	42	19	72	11	1,558	84
NM	6	3	12	6	51	N/A	74	15
NY	13	6	37	24	162	12	3,225	85
NC	5	1	21	22	75	0	1,042	27
ND	N/A	4	11	3	25	N/A	103	1
OH	24	18	56	34	282	10	1,803	25
OK	N/A	6	9	7	66	7	392	1
OR	10	1	2	7	17	*	830	63
PA	N/A	23	37	38	110	15	2,637	14
RI	3	1	6	2	16	5	83	1
SC	4	5	13	13	50	0	592	30
SD	N/A	6	6	0	27	0	28	1
TN	3	N/A	1	2	13	N/A	811	83
TX	15	12	21	35	128	N/A	1,944	384
UT	N/A	N/A	7	N/A	20	N/A	623	43
VT	1	0	3	2	7	0	65	2
VA	N/A	11	16	24	100	2	1,049	1
WA	N/A	4	20	14	81	12	514	2
WV	4	5	23	5	40	N/A	435	3
WI	5	9	33	28	82	2	816	64
WY	N/A	N/A	2	N/A	21	N/A	322	2

* = lead monitors are included with total TSP monitors

STATE REGULATORY AIR TOXICS PROGRAMS

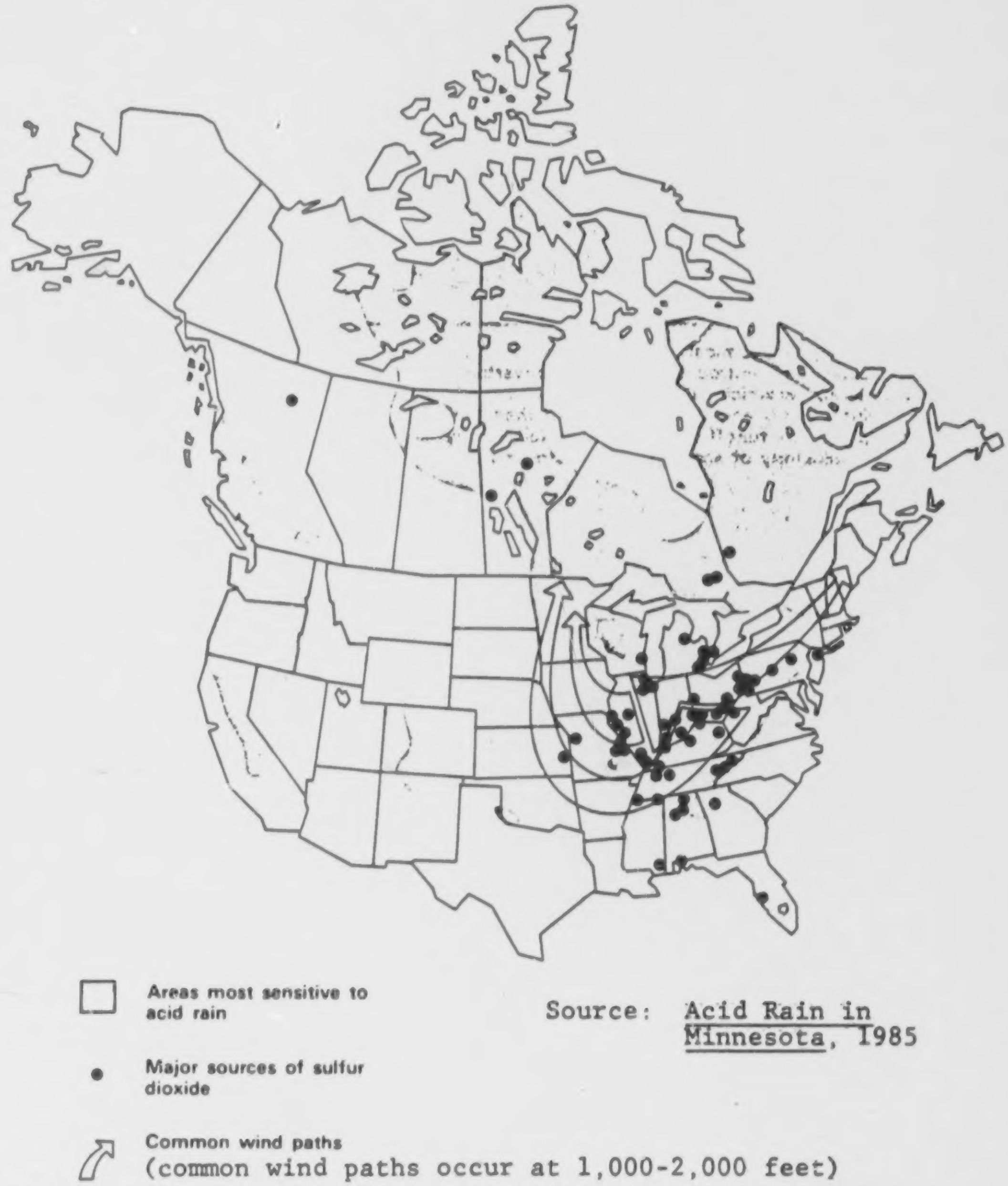
TABLE III

STATE	PROGRAM IN PLACE	PROGRAM DEVELOPING	PROGRAM BASED ON PROMULGATED REGULATIONS	PROGRAM BASED ON INFORMAL GUIDELINES	LIMITED TO SPECIFIED LIST OF POLLUTANTS	LIMITED TO SPECIFIED LIST OF SOURCES OR SOURCE CATEGORIES	USE ACCEPTABLE AMBIENT CONCENTRATIONS IN PERMIT REVIEW	USE FORMALLY ADOPTED AMBIENT STANDARDS FOR NON-CRITERIA POLLUTANTS	ACCEPTABLE AMBIENT CONCENTRATIONS OR STANDARDS BASED ON TLV*	ACCEPTABLE AMBIENT CONCENTRATIONS OR STANDARDS BASED ON ORIGINAL RESEARCH	CONTROL TECHNOLOGY REQUIREMENTS	RISK ASSESSMENT ON CASE-SPECIFIC BASIS	EMISSIONS INVENTORY FOR AIR TOXICS
AK	N	N	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Y	Y	Y
AL	Y	N	N	Y	N	N	Y	N	Y	N	N	N	N
AR	Y	N	N	Y	N	N	Y	N	Y	N	Y	N	N
AZ	Y	N/A	N/A	Y	N/A	Y	Y	N	Y	Y	N	Y	N
CA	Y	N	Y	N	Y	N	N	N	N	N	Y	Y	N
CO	N	Y	Y	N	Y	N	N	N	N	N	N	N	Y
CT	Y	N	Y	N	Y	N	Y	Y	Y	N	Y	Y	Y
DE	N	Y	N/A	N/A	N	N	Y	N	Y	N	Y	Y	N
FL	N	Y	Y	N	Y	N	Y	N	Y	N	Y	Y	N
GA	Y	N	N/A	Y	Y	N	Y	N	Y	Y	N/A	N	N
HI	N	N	N	N	N	N	N	N	N	N	N	N	N
ID	N	Y	Y	Y	N	N	Y	Y	Y	N	Y	Y	Y
IL	Y	N	N	Y	N	N	Y	N	Y	Y	Y	Y	Y
IN	N	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	N
IA	N	Y	N	Y	N	N	Y	N	N	N	N	N	N
KS	N	N	N	N	N	N	N	N	N	N	N	N	N
KY	N	Y	Y	N	Y	N	Y	Y	N	N	Y	Y	N
LA	N	N	N	N	N	N	N	N	N	N	N	N	N
ME	N	Y	N	N	N	N	N	N	Y	Y	Y	Y	Y
MD	N	Y	Y	N	N	N	Y	N	Y	N	Y	Y	Y
MA	N	Y	Y	Y	N	N	Y.	Y	Y	N	Y	Y	Y
MI	Y	N	Y	Y	N	N	Y	N	Y	Y	Y	Y	N
MN	Y	Y	N	Y	N	N	Y	N	Y	Y	N	Y	N
MS	Y	N	N	Y	N	N	Y	N	Y	Y	Y	Y	N
MO	N	Y	Y	Y	N	N	N	N	N	N	N	N	N
MT	N	Y	N	Y	N	N	Y	Y	Y	N	Y	N	N
NE	N	N	N	N	N	N	N	N	N	N	N	N	N
NV	Y	N	Y	N	N	N	Y	N	Y	N	Y	Y	N
NH	N	Y	Y	N	N	N	Y	N	Y	N	Y	Y	N
NJ	Y	N	Y	Y	Y	N	Y	Y	N	N	Y	Y	N
NM	N	N	N	N	N	N	N	N	N	N	N	N	N
NY	Y	N	N	Y	N	N	Y	N	Y	Y	Y	N	Y
NC	N	Y	Y	Y	Y	N	Y	N	Y	Y	N	Y	Y
ND	N	N	N	N	N	N	N	N	N	N	N	N	N
OH	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
OK	N	Y	Y	N	N	N	Y	N	Y	Y	Y	Y	Y
OR	Y	Y	Y	Y	N	N	Y	N	Y	N	N	N	Y
PA	Y	Y	N	N	N	N	Y	N	Y	Y	N	N	Y
RI	N	Y	Y	N	Y	N	Y	Y	N/A	Y	Y	Y	Y
SC	Y	N	Y	Y	Y	N	Y	Y	Y	N	Y	N	N
SD	N	N	N	N	N	N	N	N	N	N	N	N	N
TN	Y	N	Y	Y	N	N	Y	Y	Y	N	Y	N	N
TX	Y	N	N	Y	N	N	Y	N	Y	Y	Y	N	Y
UT	N	N	N	N	N	N	N	N	N	N	N	N	N
VT	N	Y	Y	N/A	Y	N/A	Y	Y	Y	Y	Y	Y	Y
VA	Y	N	Y	N	Y	N	Y	N	Y	N	N	N	N
WA	Y	N/A	Y	Y	Y	N	Y	N	Y	N	Y	Y	Y
WV	N	N	N	N	N	N	N	N	N	N	N	N	N
WI	N	Y	N	Y	N	N	Y	N	Y	N	Y	Y	N
WY	N	N	N	N	N	N	N	N	N	N	N	N	N

Y=YES; N=NO

* Threshold Limit Value

6

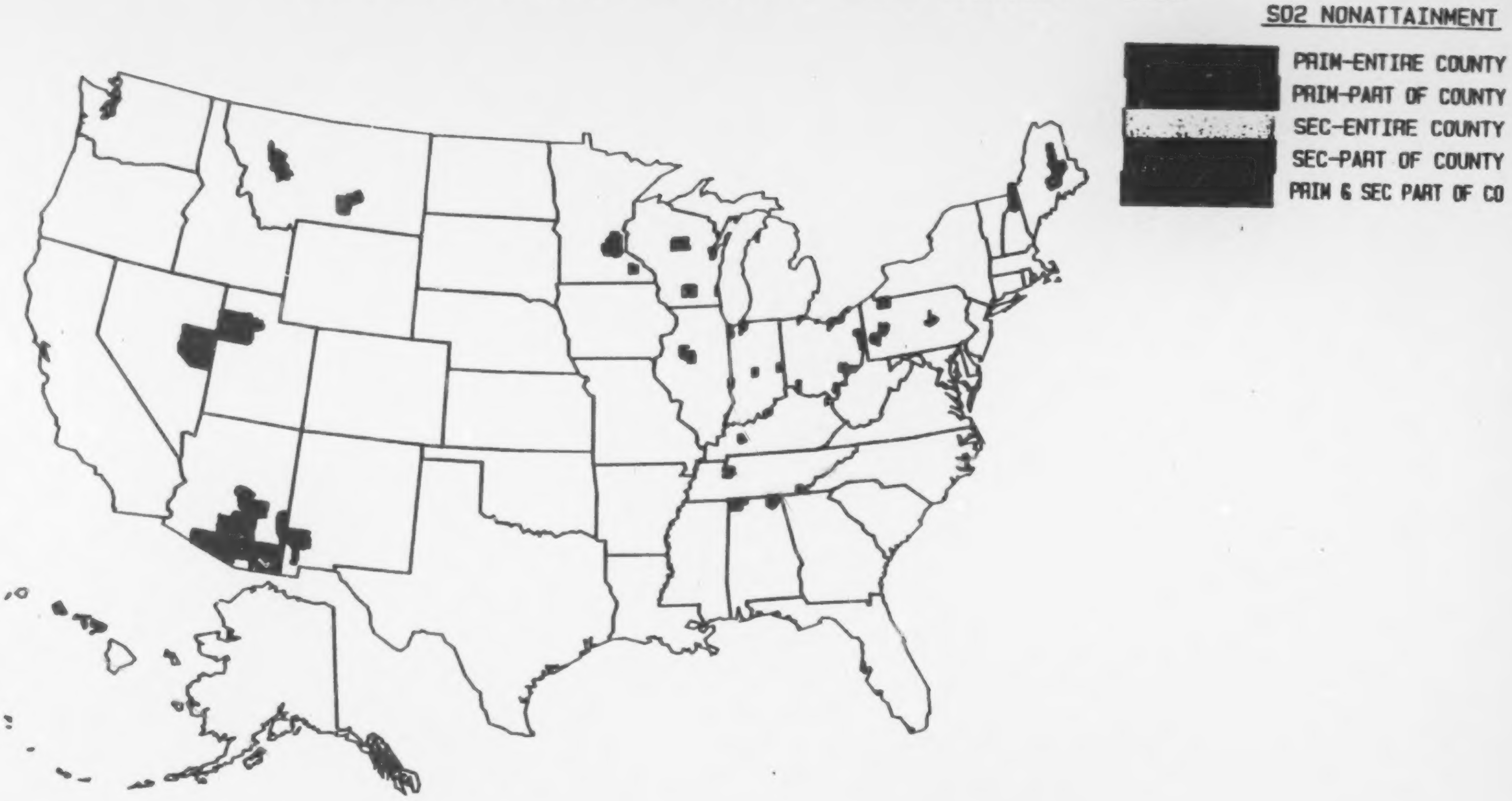

Areas most sensitive to acid rain
● Major sources of sulfur dioxide
Common wind paths

Source: Acid Rain in Minnesota, 1985

(common wind paths occur at 1,000-2,000 feet)

Figure 5. This map shows the major sources of sulfur dioxide emissions (more than 100 kilotons per year), common wind paths, and the areas of North America most sensitive to acid rain (after Galloway and Cowling, 1978).

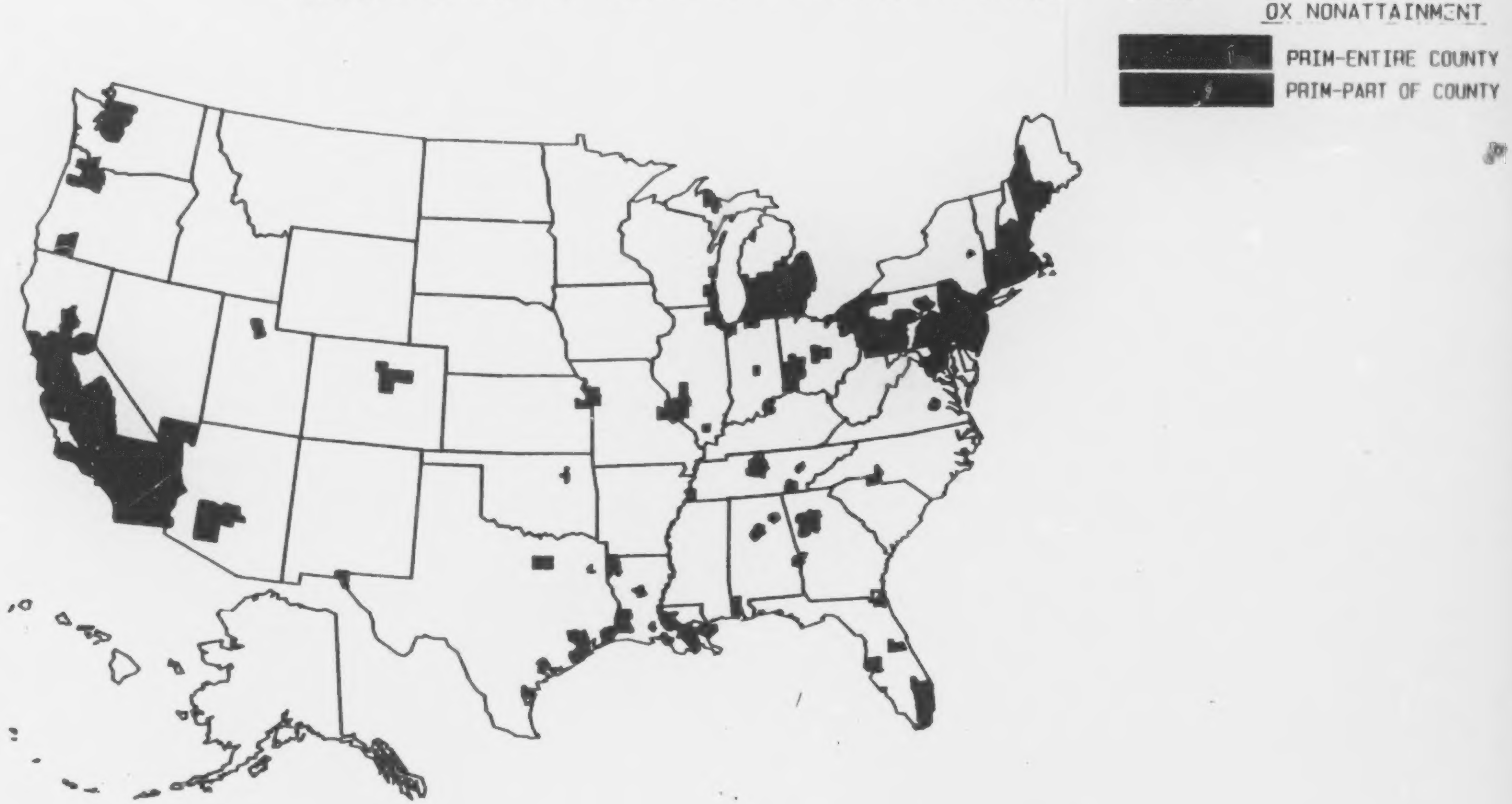
PROMULGATED LIST OF SO2 NON-ATTAINING COUNTIES - 1985


S02 NONATTAINMENT
PRIM-ENTIRE COUNTY
PRIM-PART OF COUNTY
SEC-ENTIRE COUNTY
SEC-PART OF COUNTY
PRIM & SEC PART OF CO

SEPTEMBER 1985

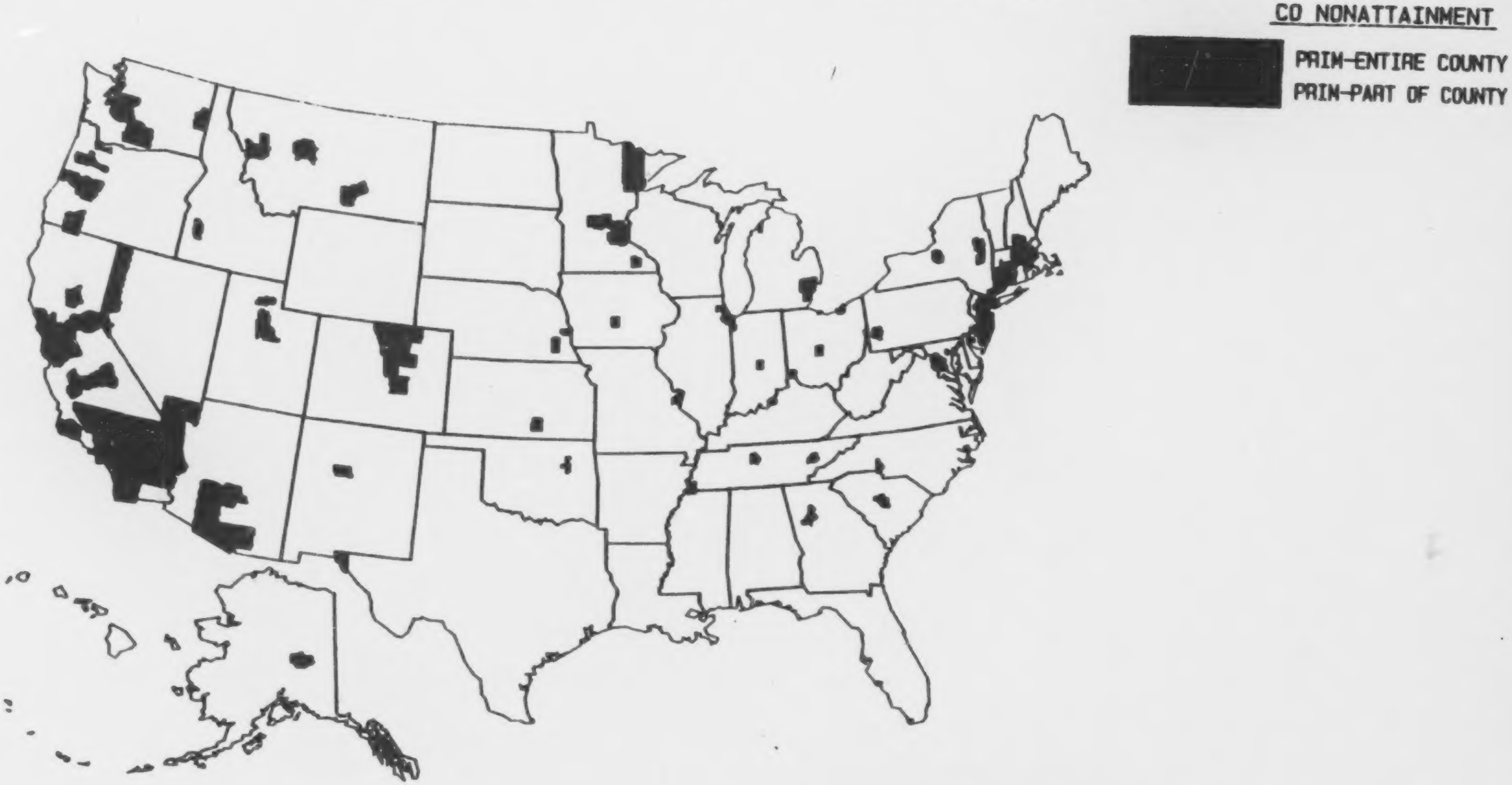
Source: EPA

PROMULGATED LIST OF OZONE NON-ATTAINING COUNTIES - 1985


OX NONATTAINMENT
PRIM-ENTIRE COUNTY
PRIM-PART OF COUNTY

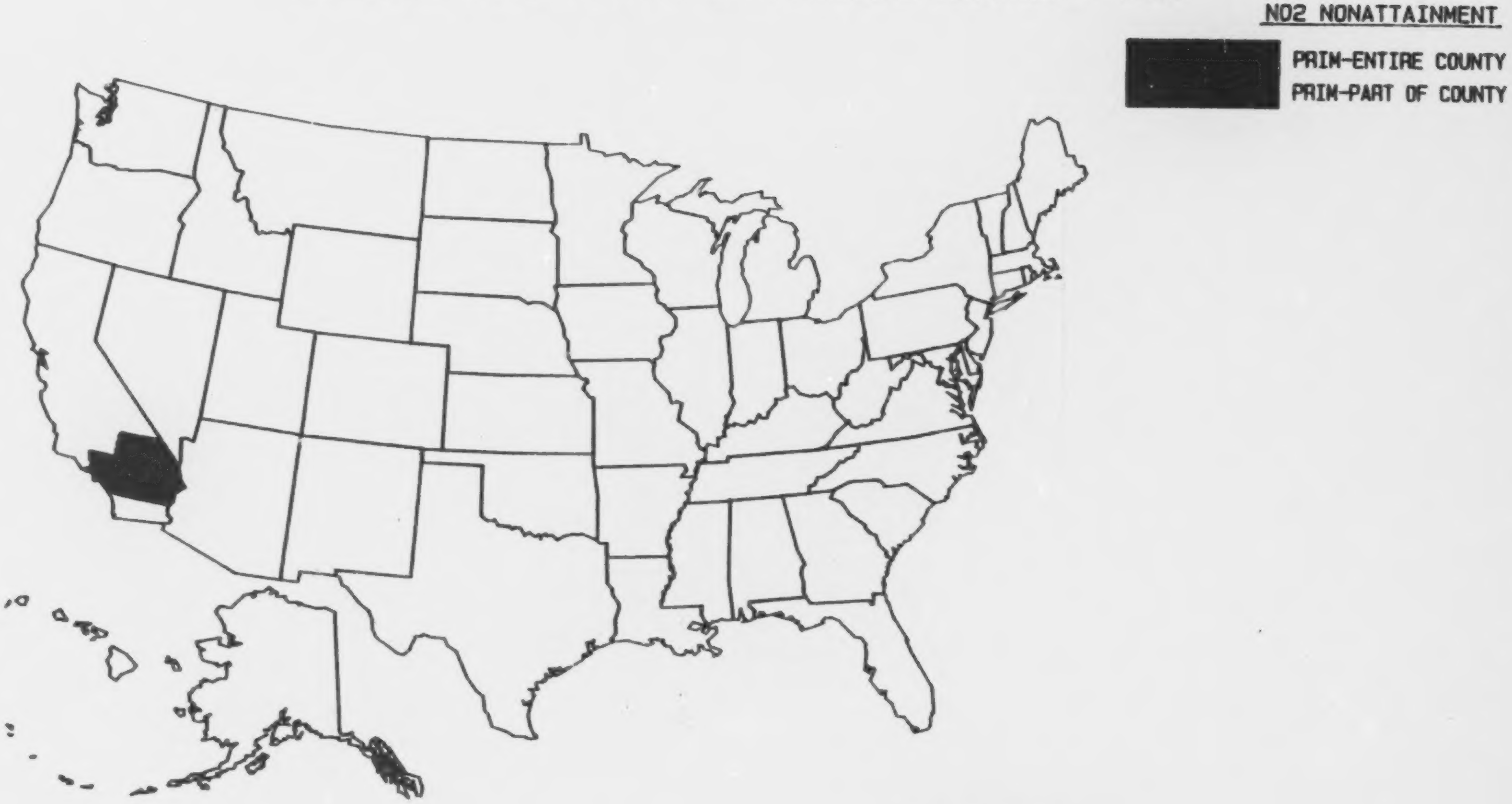
SEPTEMBER 1985
Source: EPA

PROMULGATED LIST OF CO NON-ATTAINING COUNTIES - 1985


CO NONATTAINMENT
PRIM-ENTIRE COUNTY
PRIM-PART OF COUNTY

SEPTEMBER 1985
Source: EPA

PROMULGATED LIST OF NO2 NON-ATTAINING COUNTIES - 1985


NO2 NONATTAINMENT
PRIM-ENTIRE COUNTY
PRIM-PART OF COUNTY

SEPTEMBER 1985

Source: EPA

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For a directory of the U.S. EPA national and regional offices of Air Quality Planning and Standards; U.S. state and local air pollution control agencies, Canadian federal, provincial and local air agencies and the International Joint Commission see "1986 APCA Government Agencies Directory," Journal of the Air Pollution Control Association, Pittsburgh, PA, April 1986, Vol 36, No. 4, pp. 445-477.

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THE STATE OF THE STATES 1987

SOIL CONSERVATION

2

APPENDIX

FUND FOR RENEWABLE ENERGY & THE ENVIRONMENT

Prepared by:

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Introduction

The Soil Conservation Appendix, one of six appendices designed to supplement the data presented in the 1987 State of the States report, has been compiled to allow a more detailed look at soil conservation on the state level. It provides a national picture of soil conservation efforts through maps and detailed data, and it allows comparison of the problems states face and their legislative and program responses.

Information from the main report--state rankings, primary map, brief text and primary matrix are presented in the forward section of the packet. Additional matrix information and maps, as well as soil conservation contacts are also included.

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STATE ABBREVIATIONS

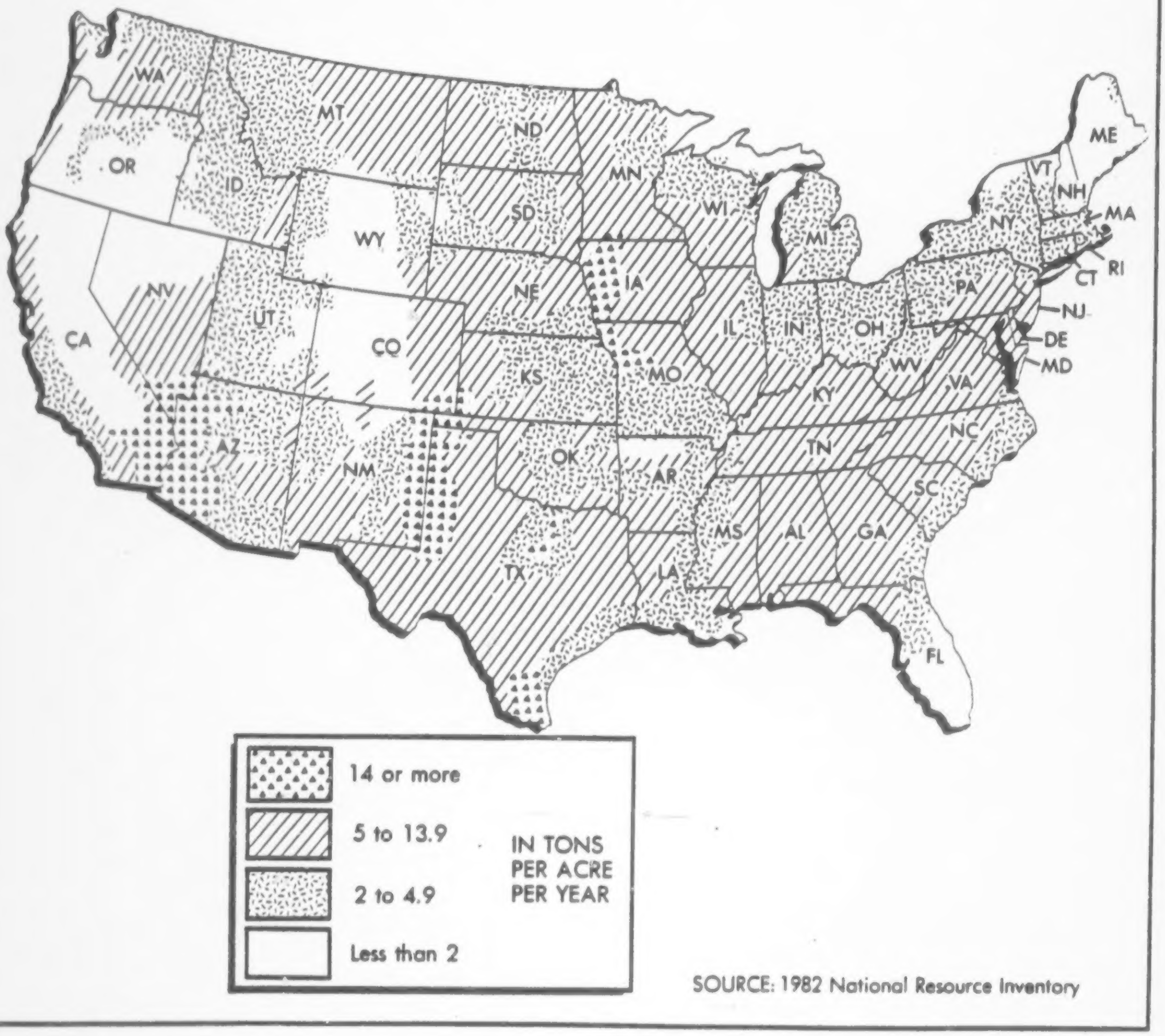
AL	ALABAMA
AK	ALASKA
AZ	ARIZONA
AR	ARKANSAS
CA	CALIFORNIA
CO	COLORADO
CT	CONNECTICUT
DE	DELAWARE
FL	FLORIDA
GA	GEORGIA
HI	HAWAII
ID	IDAHO
IL	ILLINOIS
IN	INDIANA
IA	IOWA
KS	KANSAS
KY	KENTUCKY
LA	LOUISIANA
ME	MAINE
MA	MASSACHUSETTS
MI	MICHIGAN
MN	MINNESOTA
MS	MISSISSIPPI
MO	MISSOURI
MT	MONTANA
NE	NEBRASKA
NV	NEVADA
NH	NEW HAMPSHIRE
NJ	NEW JERSEY
NM	NEW MEXICO
NY	NEW YORK
NC	NORTH CAROLINA
ND	NORTH DAKOTA
OH	OHIO
OK	OKLAHOMA
OR	OREGON
PA	PENNSYLVANIA
RI	RHODE ISLAND
SC	SOUTH CAROLINA
SD	SOUTH DAKOTA
TN	TENNESSEE
TX	TEXAS
UT	UTAH
VT	VERMONT
VA	VIRGINIA
WA	WASHINGTON
WV	WEST VIRGINIA
WI	WISCONSIN
WY	WYOMING

STATE PROGRAM RANKINGS: HOW STATES MEASURE UP

	AIR PROGRAMS	SOIL CONSERVATION PROGRAMS	GROUNDWATER PROGRAMS	HAZARDOUS WASTE PROGRAMS	SOLID WASTE PROGRAMS	RENEWABLE ENERGY & ENERGY CONSERVATION	TOTAL	RANK
AL	3	3	2	3	3	2	16	26
AK	7	3	3	2	2	1	18	25
AZ	7	3	7	5	2	3	27	19
AR	1	3	2	5	3	4	18	25
CA	10	3	7	9	9	10	48	2
CO	4	6	4	3	4	3	24	21
CT	9	6	9	4	9	7	44	4
DE	1	8	6	3	4	2	24	21
FL	7	4	9	8	6	7	41	7
GA	4	5	7	4	3	3	26	20
HI	4	4	3	2	2	4	19	24
ID	2	1	6	1	2	6	18	25
IL	7	9	5	7	7	6	41	7
IN	6	5	4	6	7	8	36	10
IA	5	10	5	5	7	7	39	8
KS	2	5	8	8	4	2	29	17
KY	7	3	1	6	8	3	28	18
LA	5	3	3	7	2	1	21	23
ME	3	6	7	6	6	8	36	10
MD	3	8	7	6	6	4	34	12
MA	6	4	8	9	6	8	41	7
MI	8	7	8	9	8	3	43	5
MN	5	6	5	9	9	4	38	9
MS	1	3	2	4	2	2	14	28
MO	5	6	7	8	1	4	31	15
MT	2	5	6	3	1	6	23	22
NE	4	6	6	2	6	7	31	15
NV	2	6	4	2	2	7	23	22
NH	6	5	5	7	5	4	32	14
NJ	9	6	7	10	10	5	47	3
NM	1	2	8	5	1	6	23	22
NY	5	5	10	8	8	7	43	5
NC	8	7	8	6	6	7	42	6
ND	1	3	4	2	3	3	16	26
OH	8	8	4	5	5	4	34	12
OK	5	5	5	4	7	3	29	17
OR	6	2	7	5	7	8	35	11
PA	8	6	5	5	3	5	32	14
RI	6	4	6	4	7	3	30	16
SC	6	5	7	5	2	6	31	15
SD	1	8	6	2	2	4	23	22
TN	3	3	4	7	5	7	29	17
TX	7	2	2	5	3	7	26	20
UT	3	4	3	2	1	3	16	26
VT	3	3	5	6	4	7	28	18
VA	8	7	6	2	3	7	33	13
WA	8	1	6	5	5	3	29	17
WV	2	5	2	4	1	1	15	27
WI	9	8	8	7	8	9	49	1
WY	1	3	8	1	2	1	16	26

AVERAGE ANNUAL EROSION OF CROPLAND

SHEET, RILL, AND WIND EROSION


WA
MT
ND
MN
OR
ID
SD
WI
MI
WY
IA
NV
NE
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IL
IN
OH
PA
CA
CO
KS
MO
WV
VA
KY
AZ
NM
OK
AR
TN
NC
SC
MS
AL
GA
TX
LA
FL
ME
VT
NH
NY
MA
RI
CT
NJ
DE
MD
14 or more
5 to 13.9
2 to 4.9
Less than 2
IN TONS PER ACRE PER YEAR

SOURCE: 1982 National Resource Inventory

SOIL CONSERVATION--THE BIG PICTURE

On average, cropland in the United States loses 4.4 tons per acre annually. In simple dollar amounts, the production problems caused by this erosion are estimated to cost $2 billion annually. Runoff carrying pesticides, herbicides, and sediment into water supplies pushes estimates of erosion related damage to $13 billion. For water, land, and productivity, the effect is a cumulative one.

Today, a total of about 118 million acres of some 345 acres of land classified as highly erodible are being cropped. According to the most recent surveys, the amount of cropland needing erosion control increased in 26 states, decreased in 21 states and remained the same in 2 states between 1977 and 1982.

To conserve soil and restore land to production can take decades and more money than farmers often have to spend. And beyond fighting the onslaught of drought, floods, and wind--the technology used in farming, and political and economic storms can also accelerate the stripping of cropland.

The backbone of soil conservation efforts is the Soil Conservation Service of the federal Department of Agriculture. The program was established in 1936 following severe drought and dust storms. It has organized soil conservation districts in every state and coordinates its work with state and local government. The traditional solution the program advocates is "conservation tillage"--the use of a variety of practices that eliminate the use of the moldboard plow and leave some crop residues on the soil after harvest.

Critics of traditional conservation tillage argue that it depends too heavily on herbicides for weed control and increases the threat of groundwater contamination. They advocate organic farming methods--legume based crop rotations, biological pest control, cover crops and shallow tillage--to reduce both erosion and minimize uses of herbicides and pesticides.

Policies on soil conservation are generally carrot-and-stick programs which pressure farmers to take action and reward them for their work. About half of the states carry out cost-sharing for conservation efforts undertaken by farmers. Many states also have erosion and sediment control laws and require soil conservation plans to be approved before virgin land is plowed. Added to these policies, the federal government recently included several incentives in the 1985 farm bill aimed at increasing soil conservation. One voluntary program allows farmers to place highly erodible land into a "conservation reserve" for 15 years in return for federal subsidies. Another provision establishes "sodbuster" regulations to discourage new cultivation on highly erodible land. Farmers now producing crops on highly erodible land have until 1995 to put conservation plans into effect, or lose USDA assistance and subsidies for any of their crops.

Ultimately, government policy may help, but the extent and success of soil conservation will be decided by economic pressures and the commitment of those farming the land.

SOIL SNAPSHOT

Iowa represents the best program in soil conservation under policies now in use. While some areas of the state are losing 14 or more tons of soil per acre each year, the state averages a loss of 9.4 tons per acre. Given the magnitude of this problem, state officials have implemented policies that combine soil loss limits with erosion and sediment control laws and a requirement for approved soil conservation plans before virgin land can be plowed. The state also offers cost-sharing with farmers for implementation of conservation measures. Of the sixty-nine percent of the cropland needing conservation tillage, fifty-one percent is now being farmed with those methods.

RANKING NOTES

States were ranked on a scale of one to ten on the strength of their environmental policies. The rank is not meant to judge particular environmental conditions in each state, but considers environmental problems as a need for program strength. Key factors weighed against this need are: legislative authority for programs, scope of established programs, extent of funding, monitoring and enforcement, and indications of progress. Although institutionalized programs rather than innovative projects are given greater weight--attention is given to assure that states did not simply "paper over" a problem with legislation.

The broad background for soil conservation rankings was the amount of tons lost per acre of cropland. Also considered as a broad measure were the percentages of cropland needing erosion control and the amount of land being tilled with such methods. Erosion and sediment control laws were seen as essential pieces of soil conservation legislation. Added to this are established soil loss limits and cost-sharing for soil conservation projects. The most effective state programs combine cost-sharing with requirements for approval of land use plans before new land is ploughed, and adequate enforcement and penalties.

Within the context of a state's erosion problem state and local funds appropriated were considered as a measure of commitment to carry out programs. Consideration was also made of states that have seen progress in saving soil between the 1977 and 1982 surveys.

SOIL CONSERVATION MATRIX

	STATEWIDE CONSERVATION PROGRAM[1]	EROSION AND SEDIMENT CONTROL LAWS[2]	ESTABLISHED SOIL LOSS LIMITS	APPROVED PLAN REQUIRED BEFORE SOIL CAN BE DISTURBED	PROVISIONS FOR ENFORCEMENT AND PENALTIES	COST-SHARING FOR SOIL CONSERVATION	AVG. TONS LOST (SHEET & RILL) PER ACRE ON TOTAL CROPLAND[3], 1982	PERCENTAGE OF CROPLAND NEEDING EROSION CONTROL	PERCENTAGE OF TOTAL CULTIVATED ACRES IN CONSERVATION TILLAGE[4], 1982	FUNDS APPROPRIATED BY STATE & LOCAL GOV. FOR SOIL CONS. PROGRAMS 1984[5]
AL	•					•	7.1	63%	23%	2,290
AK	•						ND	ND*	20	733
AZ	•						0.5	15*	5	4,920
AR	•					•	4.9	45	12	3,619
CA	•						1.2	11*	3	7,997
CO	•	•		•			2.2	68*	36	627
CT	•	•		•		•	2.8	27	15	2,267
DE	•	•		•	E	•	2.0	17	77	5,748
FL	•				E		2.0	36*	8	3,223
GA	•	•		•			6.4	63*	23	5,266
HI	•	•					6.4	41*	1	2,125
ID	•					•	5.0	58*	24	518
IL	•		•		E,P,	•	7.0	43	33	14,764
IN	•						5.5	43*	41	3,991
IA	•	•	•	•	P	•	9.4	69*	51	14,227
KS	•					•	2.7	51*	51	4,484
KY	•						9.5	46	54	5,591
LA	•						4.6	40	5	3,965
ME	•	•		•		•	2.1	35	18	1,223
MD	•	•		•	E	•	5.0	46	69	5,515
MA	•						2.1	19	5	5,047
MI	•	•		•	E		2.6	36*	26	2,549
MN	•		•			•	2.5	53*	22	16,293
MS	•					•	7.5	42	15	1,141
MO	•					•	9.8	52	39	19,020
MT	•			•		•	1.6	61*	39	2,582
NE	•					•	5.2	54*	40	20,305
NV	•	•			E		0.1	5*	44	110
NH	•	•		•			1.2	40*	14	253
NJ	•	•		•		•	1.3	55*	29	2,757
NM	•						1.3	43*	38	645
NY	•	•		•			3.0	31	12	19,590
NC	•	•		•	E	•	6.8	45	29	6,997
ND	•						1.9	50*	23	2,096
OH	•	•	•	•	E	•	3.7	34*	37	11,374
OK	•	•				•	2.2	42	30	5,907
OR	•						4.0	53*	29	3,744
PA	•	•		•	E	•	5.3	53	43	1,201
RI	•						2.5	36*	8	80
SC	•	•		•		•	3.6	27	9	3,715
SD	•	•	•	•	E	•	2.6	40	35	1,221
TN	•						10.0	54	24	1,736
TX	•						2.6	55*	16	10,284
UT	•					•	0.8	21*	16	23,128
VT	•					•	1.3	12	5	280
VA	•	•		•	E	•	6.2	43	55	4,383
WA	•						4.5	69*	30	1,152
WV	•						2.6	19	47	3,085
WI	•	•	•	•		•	4.5	46	23	12,132
WY	•						1.0	20	13	421

* increased since 1977

FOOTNOTES FOR SOIL CONSERVATION MATRIX

1. Statewide conservation programs are the most fundamental effort to save topsoil.

2. Erosion and seidment control laws, soil loss limits, and other state provisions are the next stage of soil conservation policy.
Source: "Summary of Principal Provisions of State Laws Providing for Erosion and Sediment Control," prepared by Mary Gardner, National Association of Conservation Districts, Washington, DC, July 1985.

3. Sheet and rill erosion are the primary types of damage to cropland.
Source: Figures are from the National Resources Inventory, USDA, Washington, DC, 1982.

4. Figures on soil requiring conservation tillage are from the Nation Survey of Conservation Tillage, Soil Conservation Service, Washington DC, 1983.

5. Figures on funds appropriated are from Agricultural Statistics, USDA, Washington, DC, 1985.

SCOPE OF STATE PROGRAMS

STATE	COST-SHARING FOR SOIL CONSERVATION	TAX CREDIT PROGRAM	COST-SHARING FOR WATER QUALITY PROGRAM	WIND EROSION CONTROL INCENTIVE PROGRAM	PERMANENT SOIL CONSERVATION LOAN PROGRAM	COST-SHARING FOR DAMS	COST-SHARING FOR PLANTING TREES	RANGE IMPROVEMENT LOAN	
AL	X								
AK		X							
AZ									
AR	X								
CA									
CO									
CT	X								
DE	X								
FL									
GA									
HI									
ID	X		X						
IL	X								
IN									
IA	X		X	X	X				
KS	X		X			X			
KY									
LA									
ME	X								
MD	X		X						
MA									
MI									
MN	X		X						
MS	X		X				X		
MO	X		X						
MT	X		X			X	X	X	
NE	X		X				X	X	
NV									
NH									
NJ	X		X						
NM									
NY									
NC	X	X	X				X		
ND			X						
OH	X		X						
OK	X		X						
OR									
PA	X								
RI									
SC	X	X	X			X	X		
SD	X								
TN									
TX									
UT	X							X	
VT	X								
VA	X	X	X				X		
WA									
WV									
WI	X		X						
WY									

PROVISIONS, BUDGET, & STAFF

STATE	PUBLIC MEETINGS HELD	INFORMATION MATERIALS DEVELOPED	STATE AUTHORITY TO ADOPT PROGRAM IF LOCAL AGENCY FAILS TO	STATE AUTHORITY TO APPROVE LOCAL PLAN	STATE AUTHORITY TO APPROVE STATE & FEDERAL PLANS	LONG-TERM CONSERVATION PROGRAM COMPLETED	FUNDS APPROPRIATED BY STATE & LOCAL GOVTS. FOR CONSERVATION PROGRAMS (1985)	NUMBER OF EMPLOYES (1983)
AL	X	X				X	2,960	331
AK	X					X	733	45
AZ	X					X	4,920	175
AR		X				X	3,619	337
CA		X					7997	589
CO	X	X				X	627	400
CT	X					X	2,267	—
DE	X		X	X	X	X	5,748	17
FL	X	X				X	3,223	293
GA	X	X	X	X		X	5,266	370
HI	X		X			X	2,125	74
ID	X	X				X	518	289
IL	X	X	X	X	X	X	14,764	490
IN	X	X				X	3991	460
IA	X	X		X		X	14,227	500
KS	X	X				X	4,494	524
KY						X	5,591	821
LA	X	X				X	3,965	194
ME	X	X				X	1,223	80
MD	X	X	X	X	X	X	5,515	120
MA	X					X	5,047	—
MI	X	X		X		X	2,549	415
MN	X	X		X		X	16,293	460
MS						X	1,141	410
MO	X	X				X	19,020	555
MT	X				X	X	2,582	295
NE	X	X				X	20,305	350
NV	X	X					110	—
NH						X	253	50
NJ	X	X		X			2,757	80
NM	X	X				X	645	291
NY	X	X				X	19598	—
NC	X	X	X	X	X	X	6,997	487
ND	X	X				X	2,096	272
OH	X		X	X		X	11374	440
OK	X	X				X	5,907	445
OR	X	X				X	3744	320
PA	X			X	X	X	1,201	—
RI						X	80	15
SC	X					X	3,715	228
SD	X	X				X	1,221	344
TN	X	X				X	1,736	475
TX	X	X				X	10,284	1005
UT	X	X				X	23,128	194
VT	X					X	280	67
VA	X	X	X	X	X	X	4383	317
WA	X	X				X	1,152	251
WV	X	X				X	3,085	113
WI	X	X		X		X	12,132	429
WY	X					X	421	185

TOTAL CROPLAND EROSION 1982
(Sheet & Rill)

STATE	TOTAL ACRES (1000)	TONS (1000)	AVERAGE TONS/ACRE
IA	26,440.7	247,791.8	9.4
IL	24,727.4	172,432.0	7.0
MO	14,998.4	146,452.9	9.8
NE	20,276.7	105,035.4	5.2
TX	33,319.6	87,413.8	2.6
KS	29,118.3	79,830.1	2.7
IN	13,781.3	75,791.8	5.5
MN	23,024.1	57,706.3	2.5
KY	5,934.2	56,537.3	9.5
TN	5,592.1	55,896.4	
MS	7,415.3	55,268.1	7.5
ND	27,039.2	52,379.7	1.9
WI	11,456.8	51,141.3	4.5
OH	12,447.1	46,587.3	3.7
NC	6,694.8	45,667.2	6.8
SD	16,947.2	44,537.9	2.6
GA	6,568.4	41,713.7	6.4
AR	8,101.5	39,362.1	4.9
WA	7,793.4	37,194.6	4.8
AL	4,510.3	32,183.1	7.1
ID	6,390.1	32,132.0	5.0
PA	5,896.3	31,171.1	5.3
LA	6,408.9	29,310.2	4.6
MT	17,196.9	26,614.1	1.6
OK	11,568.1	25,034.1	2.2
CO	10,602.7	22,876.0	2.2
VA	3,396.9	21,008.8	6.2
MI	9,443.1	20,982.5	2.6
NY	5,912.1	17,413.3	3.0
OR	4,356.4	17,299.2	4.0
SC	3,578.7	12,931.6	3.6
CA	10,517.7	12,138.8	1.2
MD	1,794.4	8,890.3	5.0
FL	3,556.8	7,190.2	2.0
NJ	809.4	4,577.3	5.7
NM	2,412.7	3,110.6	1.3
WV	1,093.1	2,810.0	2.6
WY	2,587.4	2,542.0	1.0
HI	333.2	2,115.0	6.4
ME	1,988.6	1,988.6	2.1
UT	2,038.7	1,543.1	0.8
DE	519.1	1,042.0	2.0
VT	648.4	831.1	1.3
CT	244.7	694.0	2.8
MA	297.2	620.8	2.1
AZ	1,206.3	582.7	0.5
NH	157.8	191.1	1.2
RI	27.2	66.7	2.5
NV	859.7	64.1	0.1
AK	----	----	---

National Association of Conservation Districts

NACD/CTIC SURVEY -- 1985

NATIONAL

STATE	ACRES	NOTILL	RIDGETILL	STRIPTILL	MULCHTILL	RED. TILL	CONS. TILL*
ALABAMA	3,451,757	261,096	60	66,600	470,365	0	798,121
ALASKA	33,415	16	0	0	6,151	540	6,707
ARIZONA	893,805	4,820	0	0	16,675	34,104	55,599
ARKANSAS	6,956,143	110,074	1,380	50	247,388	516,246	875,140
CALIFORNIA	7,882,582	40,788	1,310	50	61,967	154,175	258,290
COLORADO	7,187,727	154,102	27,248	32,440	1,074,289	1,320,862	2,608,941
CONNECTICUT	89,834	6,844	45	0	6,300	0	13,189
DELAWARE	616,856	256,182	0	700	220,519	0	477,401
FLORIDA	2,614,482	39,669	9,725	543	56,630	109,714	215,281
GEORGIA	5,888,599	246,396	450	7,057	1,110,408	5,500	1,369,811
HAWAII	316,850	0	0	0	0	4,500	4,500
IDAHO	4,508,943	209,524	1,036	0	488,290	384,522	1,083,372
ILLINOIS	23,283,444	1,461,697	202,330	12,640	6,079,901	0	7,756,568
INDIANA	12,425,826	926,959	171,824	22,035	4,011,333	19,500	5,151,651
IOWA	23,705,631	822,168	277,908	48,811	10,927,865	0	12,076,752
KANSAS	21,828,162	659,758	66,790	5,940	5,366,115	5,082,772	11,181,375
KENTUCKY	4,284,298	962,112	600	255	452,589	922,980	2,338,536
LOUISIANA	4,628,984	51,683	0	45	91,605	123,449	266,782
MAINE	310,885	1,901	600	0	28,505	25,147	56,153
MARYLAND	1,526,346	462,546	0	1,100	587,838	0	1,051,484
MASSACHUSETTS	79,536	2,110	0	0	569	1,575	4,254
MICHIGAN	6,555,558	325,361	16,271	3,876	1,379,881	0	1,725,389
MINNESOTA	19,721,833	125,115	384,341	29,782	3,827,168	10,875	4,377,281
MISSISSIPPI	5,415,054	120,119	1,086	10	212,705	460,086	794,006
MISSOURI	11,402,711	896,891	9,005	11,441	3,493,092	0	4,410,429
MONTANA	8,545,014	371,832	5,200	162	1,548,544	1,418,859	3,344,598
NEBRASKA	16,360,355	531,469	490,144	275,413	3,936,189	1,302,457	6,535,672
NEVADA	142,523	4,243	0	0	25,342	33,283	62,868
NEW HAMPSHIRE	28,526	1,279	0	0	1,258	1,533	4,070
NEW JERSEY	521,588	80,001	0	0	205	69,278	149,484
NEW MEXICO	1,325,346	24,698	6,340	2,650	179,824	285,937	499,449
NEW YORK	2,733,676	69,624	518	400	59,845	213,768	344,155
NORTH CAROLINA	5,177,722	705,942	39,093	19,115	442,911	317,182	1,524,243
NORTH DAKOTA	19,058,627	653,063	13,070	0	1,910,497	1,872,444	4,449,074
OHIO	9,954,194	1,263,351	47,400	500	1,897,540	514,110	3,722,901
OKLAHOMA	9,673,761	80,319	5,190	12,180	2,275,147	495,330	2,868,166
OREGON	2,283,742	130,168	0	440	314,242	223,310	668,160
PENNSYLVANIA	3,149,644	610,931	1,006	50	436,261	300,464	1,348,712
RHODE ISLAND	9,255	468	0	0	280	0	748
SOUTH CAROLINA	2,884,847	130,761	150	9,915	37,416	82,233	260,495
SOUTH DAKOTA	13,896,920	342,313	83,057	10,401	4,456,885	0	4,892,656
TENNESSEE	4,006,240	450,992	2,520	1,454	528,136	1,335	984,437
TEXAS	24,641,453	307,824	45,011	19,870	2,140,582	1,589,863	4,103,150
UTAH	654,888	27,207	0	0	28,646	46,885	102,736
VERMONT	145,253	4,547	0	0	250	2,344	7,141
VIRGINIA	2,357,711	691,632	3,000	6,138	349,782	251,834	1,302,366
WASHINGTON	5,354,466	95,321	10,000	4,000	1,226,848	282,263	1,618,432
WEST VIRGINIA	151,319	49,026	0	0	13,092	9,114	71,232
WISCONSIN	6,962,516	166,620	38,855	17,030	1,194,568	198,067	1,615,140
WYOMING	813,860	6,704	360	0	60,095	38,464	105,623
PUERTO RICO	76,024	1,608	0	0	27,299	11,576	40,483
NATIONAL	316,862,831	14,946,895	1,962,923	623,103	63,309,832	18,738,482	99,584,235

* SUM OF NOTILL,RIDGETILL,STRIPTILL,MULCHTILL,REDUCED TILL

Agricultural Conservation Program and Emergency Conservation Program: Participation and assistance, by States and Caribbean area, 1984 fiscal year

State or Territory	Agricultural conservation program					Emergency conservation program		
	Participating farms	Area served	Assistance			Participating farms	Area served	Assistance
			Regular	Long term	Total assistance			
	Number	*1,000 acres*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*Number*	*1,000 acres*	*1,000 dollars*
Ala	4,073	120	3,104	730	3,834	80	6	88
Alaska	43	3	110	39	149			
Ariz	534	226	1,151	126	1,277	282	306	4,082
Ark	4,247	163	2,604	381	2,985	19	5	70
Calif	1,510	129	3,554	316	3,870	346	96	2,597
Colo	2,067	321	3,350	487	3,837	275	45	308
Conn	815	17	177	25	202	11	(1)	29
Del	406	21	205	19	224			
Fla	3,171	150	2,566	319	2,885			
Ga	5,315	133	6,416	346	6,762	55	5	90
Hawaii	364	22	470	63	533	9	1	24
Idaho	1,503	116	2,213	408	2,621	5	1	23
Ill	4,257	92	5,203	916	6,119	7	(1)	10
Ind	4,574	137	2,469	433	2,902			
Iowa	6,604	155	5,899	642	6,541	91	1	58
Kans	3,433	178	3,378	664	4,042			
Ky	5,913	110	3,027	651	3,678	61	(1)	55
La	4,561	198	2,784	354	3,138			
Maine	1,259	30	1,042	393	1,435			
Md	627	10	589	345	934			
Mass	822	17	317	32	349	11	(1)	81
Mich	6,013	187	3,072	305	3,377			
Minn	5,523	208	4,682	424	5,106	1	(1)	2
Miss	4,927	93	3,448	491	3,939	368	10	347
Mo	7,084	154	6,134	431	6,565	9	(1)	3
Mont	2,586	793	3,613	489	4,102			
Nebr	3,631	305	3,033	315	3,348	172	9	217
Nev	292	42	534	219	753	68	22	213
N.H.	527	22	386	49	435	7	(1)	9
N.J.	816	41	313	25	338			
N. Mex	1,194	575	1,612	235	1,847	6	2	35
N.Y.	3,600	80	3,144	459	3,603	6	(1)	22
N.C.	20,437	296	2,969	295	3,264	236	17	176
N. Dak	4,661	340	3,202	347	3,549			
Ohio	5,157	102	2,743	362	3,105			
Okla	4,771	274	4,106	402	4,508	383	96	780
Oreg	1,656	211	2,749	378	3,127	36	8	114
Pa	3,892	71	2,731	301	3,032	64	1	39
R.I.	189	3	69	12	81			
S.C.	3,128	106	1,753	215	1,968	25	3	43
S. Dak	3,790	280	1,829	181	2,010	62	3	72
Tenn	7,168	142	3,493	487	3,980	51	6	133
Tex	10,517	1,255	11,730	1,341	13,071	182	36	497
Utah	1,103	184	1,838	1,771	3,609	615	56	1,565
Vt	606	12	830	61	891	43	1	40
Va	5,676	106	2,090	200	2,290			
Wash	2,146	180	3,346	428	3,774	8	1	78
W. Va	3,692	44	1,038	140	1,178			
Wis	4,764	80	3,362	356	3,718	16	(1)	12
Wyo	651	174	1,001	347	1,348	23	6	50
U.S.	177,231	8,873	129,478	19,255	148,733	3,496	761	12,024
P.R.	683	9	379	46	425			
V.I.	11	1	17	0	17			
Total	177,925	8,883	129,874	19,301	149,175	3,496	761	12,024

[1] Less than 500 acres served.

Agricultural Stabilization and Conservation Service. Totals are the sum of rounded data.

·Agricultural Conservation Program: Selected conservation and pollution abatement practices performed, by States and Caribbean area, 1984 fiscal year

State or Territory	Regular annual agreements						
	Diversions (area served)	Conservation tillage	Permanent wildlife habitat (area served)	Sediment retention, erosion, or water control structures	Sod waterways (area served)	Windbreaks (area served)	Irrigation water conservation (area served)
	Acres	*Acres*	*Acres*	*Number*	*Acres*	*Acres*	*Acres*
Ala	579	26,956	368	51	1,586		
Alaska		973			10		
Ariz				119		46	14,819
Ark	37	3,681		878	4		42,985
Calif	1,486	6,053		142		58	56,328
Colo	901	14,118	107	71	140	3,175	67,840
Conn		1,307			1	5	
Del		16,020	2	13	10	20	
Fla	52	3,190		652	430		7,348
Ga	186	3,968	100	3	3,070		
Hawaii	91			4	437	302	708
Idaho	88	14,963	34	98	1,015	119	30,571
Ill	1,866	34,949	48	461	10,506	173	
Ind	559	52,880	132	1,284	9,925	60	
Iowa	229	67,308	760	215	7,316	496	
Kans	2,250	4,380	496	39	5,100	341	10,118
Ky	1,249	25,448	10	107	6,367		
La		22,536		1,504	1,930		7,800
Maine	853	6,786		44	1,361		
Md	361	229		54	1,974		
Mass	18	1,075		5	30	1	67
Mich	2,046	66,236	4,603	260	5,575	1,172	
Minn	45,506	74,780	2,949	197	6,339	20,706	
Miss	1,528	18,333	41	1,272	501		
Mo	1,278	8,703		306	5,634		
Mont	8	30,136	217	9	10,818	1,624	34,602
Nebr	2,451	3,962	9	73	6,654	3,650	15,311
Nev				66		39	21,353
N.H	34	96	13	6	71		
N.J	110	361		4	570	106	14
N. Mex	3,901	5,616		347		234	18,901
N.Y	1,474	22,731	49	27	706	101	219
N.C	194	45,229	1	46	2,420	299	
N. Dak	2,434	240	6,361	5	30,278	44,616	365
Ohio	202	46,018	91	1,194	6,607	225	
Okla	10,329	1,406	2	279	24,342	57	7,809
Oreg	2,530	23,537	13	110	1,553	123	22,226
Pa	2,506	8,517	3	104	3,248	1	
R.I	3	14		3	15		
S.C	17	38,708			967		
S. Dak	88	31,840	3,339	1	1,428	13,523	890
Tenn	2,146	51,296	15	725	2,186		
Tex	9,060	3,953	6	303	34,778	60	126,642
Utah	376			13			38,338
Vt	576	1,314	583	57	255	2	
Va	105	25,508	56	10	2,193		
Wash	710	78,458	7	73	936	153	13,664
W. Va	16	1,558	3		33		
Wis	1,040	35,664	1,278	90	3,598	196	
Wyo		946		1		95	38,008
U.S	100,846	960,268	22,255	11,096	185,894	91,738	646,646
P.R	5						
V.I							
Total	100,851	960,268	22,255	11,096	185,894	91,738	646,646

·Agricultural Conservation Program: Selected conservation and pollution abatement practices performed, by States and Caribbean area, 1984 fiscal year—Continued

State or Territory	Regular annual agreements—Continued						
	Establishing permanent cover	Improving permanent cover	Planting trees	Timber stand improvement	Water impoundment reservoirs	Stripcropping	Terrace systems (area served)
	Acres	*Acres*	*Acres*	*Acres*	*Number*	*Acres*	*Acres*
Ala	12,187	1,785	5,300	1,370	29		3,842
Alaska	617	127	6				
Ariz	28	168,400			4		
Ark	12,299	29,686	600	192	762		14
Calif	1,270	16,318	306	129	8		
Colo	4,067	22,087	50	22	25		16,900
Conn	1,148	150	14	65	1	81	
Del	207		6				15
Fla	16,523	9,828	7,918	1,480			661
Ga	16,014	21,943	6,275	602	65		11,880
Hawaii	179	7,717			5		879
Idaho	5,234	12,712	84	190	3	173	4,812
Ill	7,744	2,879	123	474	67	2,741	9,979
Ind	18,694	8,121	886	1,720	180		1,436
Iowa	12,492	7,807	180	80	99	6,407	16,876
Kans	4,455	2,974	2		47		66,842
Ky	26,060	10,886	169	142	78	566	422
La	10,702	22,813	521	9	40		926
Maine	1,779	827	1,060	1,971		306	22
Md	845	324	752	302	6	1,966	30
Mass	894	76	84	166	1	8	
Mich	26,128	1,514	2,342	277	1	458	
Minn	10,502	524	3,582	875	237	8,218	4,230
Miss	13,474	8,678	1,683	177	707		3,678
Mo	22,411	19,792	121	460	816	121	20,234
Mont	36,863	138,142	6	492	34	14,136	
Nebr	3,853	14,562	22		66	2,101	37,781
Nev	319	4,017					
N.H.	1,115	847	5	676		43	63
N.J.	1,865	19	2		2	37	150
N. Mex	1,748	57,861		109	9		3,083
N.Y.	13,303	431	689	843	4	4,213	159
N.C.	7,617	36,227	1,725	164	13	370	551
N. Dak	48,522	509	45	2	71	4,478	1,293
Ohio	8,384	11,828	261	800	8	197	5
Okla	42,287	5,844	163		1,045		36,231
Oreg	6,578	42,782	1,316	2,211	23		18,759
Pa	12,196	5,683	216	670	3	14,001	943
R.I.	19	41	10	14			9
S.C.	8,006	6,341	4,123	1,867	35	2,096	882
S. Dak	53,265	11,486	10	30	63	9,182	8,880
Tenn	37,379	13,285	164	15	617	113	3,779
Tex	71,896	225,639	852	121	880		53,335
Utah	1,407	83,725			3		2,451
Vt	2,681			87	2	176	
Va	8,931	23,045	1,646	225	46	630	110
Wash	9,881	16,744	2,292	4,169	11	10,974	8,380
W. Va	1,569	36,814	74	61	36		
Wis	9,016	665	5,361	1,482	18	11,102	985
Wyo	3,002	25,630		23	6		89
U.S.	619,296	1,103,219	50,951	22,838	5,647	92,287	317,204
P.R.	625	2,123	118	2	1		837
V.I.	125	661					
Total	620,046	1,106,003	51,069	22,840	5,648	92,287	318,041

-Agricultural Conservation Program: Selected conservation and pollution abatement practices performed, by States and Caribbean area, 1984 fiscal year—Continued

State or Territory	Long-term agreements						
	Diversions (area served)	Conservation tillage	Permanent wildlife habitat (area served)	Sediment retention, erosion, or water control structures	Sod waterways (area served)	Windbreaks (area served)	Irrigation water conservation (area served)
	Acres	*Acres*	*Acres*	*Number*	*Acres*	*Acres*	*Acres*
Ala.	164	1,843	37	66	794		
Alaska	10	744				174	
Ariz							1,978
Ark	30	101	3	13	74		7,616
Calif	51		60	30		640	5,944
Colo	82	180		16	166		6,639
Conn	10	22		1	2		
Del		264					
Fla		554		156			2,589
Ga	52	168		2	867		
Hawaii	30					8	
Idaho	60	3,902	6	54	696		2,626
Ill	216	1,578	4	64	250	1	
Ind	110	1,108	12	236	759	2	
Iowa	41	784		23	41	3	
Kans	166	421		6	718	6	64
Ky	963	287	1	28	2,071		
La				98	130		4,441
Maine	567	4,842		9	597		
Md	17				41		
Mass		46					46
Mich	37	2,951	60	34	904	44	
Minn	92	1,982	277	21	191	266	
Miss	155	943		44	214		
Mo	182	784	30	19	231		
Mont	200			1	811		6,471
Nebr	159	92		33	1,431	267	390
Nev							5,804
N.H	17				12		
N.J		14			27	5	35
N. Mex	2,150			8	330		1,132
N.Y	648	1,463		13	413		16
N.C	53	496	327	2	364		
N. Dak	106	18,228	27		592	330	30
Ohio	68	1,362	18	31	731	30	
Okla	1,157		60	41	697		2,066
Oreg	221	3,473	6	15	550		391
Pa	754	61	1	9	668		
R.I	4	30		1	3		
S.C	5	1,242		1	217		
S. Dak		1,710	120		160	1,042	497
Tenn	202	4,476		62	396		
Tex	1,903	159		5	2,361		5,149
Utah			16	3			12,334
Vt	36	2		3	25		
Va	121	319	60	1	175	30	
Wash		1,063		2	1	41	2,158
W. Va	14	10		1	6		
Wis	153	585	37	25	1,360	2	
Wyo		1,706				30	4,637
U.S	11,181	58,941	1,201	1,366	19,631	3,518	73,363
P.R							
V.I							
Total	11,181	58,941	1,201	1,366	19,631	3,518	73,363

-Agricultural Conservation Program: Selected conservation and pollution abatement practices performed, by States and Caribbean area, 1984 fiscal year—Continued

State or Territory	Long-term agreements—Continued						
	Establishing permanent cover	Improving permanent cover	Planting trees	Timber stand improvement	Water impoundment reservoirs	Stripcropping	Terrace systems (area served)
	Acres	*Acres*	*Acres*	*Acres*	*Number*	*Acres*	*Acres*
Ala.	2,320	478	684		13		2,402
Alaska	277						
Ariz		1,086					
Ark	1,929	2,018	79		23		31
Calif	217	1,489		10	1		
Colo	380	6,903			5		3,086
Conn	4			6		66	4
Del							64
Fla	506	800	506	23			
Ga	1,321	861	1,321		18		1,380
Hawaii		5,575			3		
Idaho	972	4,940	5		4	376	2,314
Ill	229	175	8	30	1	60	8,40[illegible]
Ind	958	268	30	262	11		775
Iowa	40				6		3,577
Kans	190	419			4		13,697
Ky	1,521	462	16		5	314	804
La	1,061	984	13		1		43
Maine	335	22	48	67		607	107
Md	178	12		115	9	82	
Mass				49		27	
Mich	2,380	223	41	66	1	137	11
Minn	149	91	81	30	6	422	1,029
Miss	8,106	1,027	70	40	48		832
Mo	1,636	912			3	80	2,778
Mont	2,265	24,524				86	
Nebr	1,020	12,171			11	46	10,046
Nev		7,519					
N H	123	20				25	
N J	23				1		24
N. Mex	404	7,580					640
N Y	822	146	13	101		2,607	61
N C	1,335	152	164		8	744	151
N. Dak	1,371	940			2	766	8
Ohio	742	1,922	13	229	3		2
Okla	6,184	344			61		1,942
Oreg	378	3,879	90	257	2		7,530
Pa	607	416		66		1,063	526
R I							7
S C	1,473	464	106	10	18	616	230
S. Dak	1,603	2,411		127	5	462	597
Tenn	2,679	2,197	33	5	36	23	450
Tex	8,812	101,907		100	31		7,194
Utah	280	21,294					1,106
Vt	97	14				60	
Va	822	1,738	17	11	5	380	21
Wash	258	1,321	115	174	1		354
W. Va	66	2,796		10	9	3	
Wis	262	13	157	47		721	506
Wyo	354	9,386					
U.S.	46,391	230,624	3,500	1,825	330	9,460	60,536
P.R.	323	118					
V.I.							
Total	46,714	230,742	3,500	1,825	330	9,460	60,536

Agricultural Stabilization and Conservation Service.

-Soil conservation districts: Dates of State Laws, number of districts organized, approximate total area and number of farms, cumulative through Sept. 30, 1964

State or Territory	Date district law became effective	Districts organized [1]	Approximate area and number of farms within organized districts	
			Total area	Farms (and ranches)
		Number	*1,000 acres*	*Thousands*
Ala	Mar. 18, 1939	67	32,454	58
Alaska	Mar. 25, 1947	9	375,304	1
Ariz [2]	June 16, 1941	36	62,584	8
Ark	July 1, 1937	76	33,611	65
Calif	June 28, 1938	121	75,302	56
Colo	May 6, 1937	90	61,423	39
Conn	July 18, 1945	8	3,132	4
Del	Apr. 2, 1943	3	1,266	3
Dist. of Col.	July 12, 1962	1	44	0
Fla	June 10, 1937	62	38,966	31
Ga	Mar. 23, 1937	40	37,681	56
Hawaii	May 19, 1947	15	4,069	4
Idaho	Mar. 9, 1939	51	52,654	36
Ill	July 9, 1937	98	30,086	111
Ind	Mar. 11, 1937	92	33,102	89
Iowa	July 4, 1939	100	36,012	126
Kans	Apr. 10, 1937	105	52,649	74
Ky	June 11, 1940	121	35,377	102
La	July 27, 1938	40	28,102	31
Maine	Mar. 25, 1941	16	17,529	7
Md	June 1, 1937	24	6,273	19
Mass	June 28, 1945	16	5,011	5
Mich	July 23, 1937	83	37,241	69
Minn	Apr. 26, 1937	72	37,796	79
Miss	Apr. 4, 1938	85	30,289	54
Mo	July 23, 1943	111	42,164	113
Mont	Feb. 28, 1939	60	59,724	25
Nebr	May 18, 1937	24	48,982	64
Nev	Mar. 30, 1937	30	70,606	2
N.H	May 10, 1945	10	5,955	3
N.J	July 1, 1937	16	4,813	10
N. Mex	Mar. 17, 1937	47	60,006	22
N.Y	July 20, 1940	57	30,469	43
N.C	Mar. 22, 1937	94	31,226	39
N. Dak	Mar. 16, 1937	62	46,149	43
Ohio	June 5, 1941	88	36,383	96
Okla	Apr. 15, 1937	89	43,726	72
Oreg	Apr. 7, 1939	47	60,603	33
Pa	July 2, 1937	66	30,352	59
R.I	Apr. 26, 1943	3	677	1
S.C	Apr. 17, 1937	46	19,346	29
S. Dak	July 1, 1937	89	40,327	49
Tenn	Mar. 10, 1939	95	36,450	97
Tex	Apr. 24, 1939	201	169,890	174
Utah	Mar. 23, 1937	38	40,229	16
Vt	Apr. 18, 1939	14	5,935	7
Va	Apr. 1, 1938	44	35,630	54
Wash	Mar. 17, 1939	49	37,073	20
W. Va	June 12, 1939	14	15,411	17
Wis	July 1, 1937	72	34,858	90
Wyo	May 22, 1941	37	60,560	11
U.S.		2,921	2,184,348	2,351
P.R	July 1, 1946	17	2,189	32
V.I	June 1946	1	110	
Guam	May 31, 1964	2	135	.1
Total		2,941	2,186,782	2,383

[1] For specific procedure on organization of soil conservation districts, reference should be made to each of the respective State soil conservation district's laws.

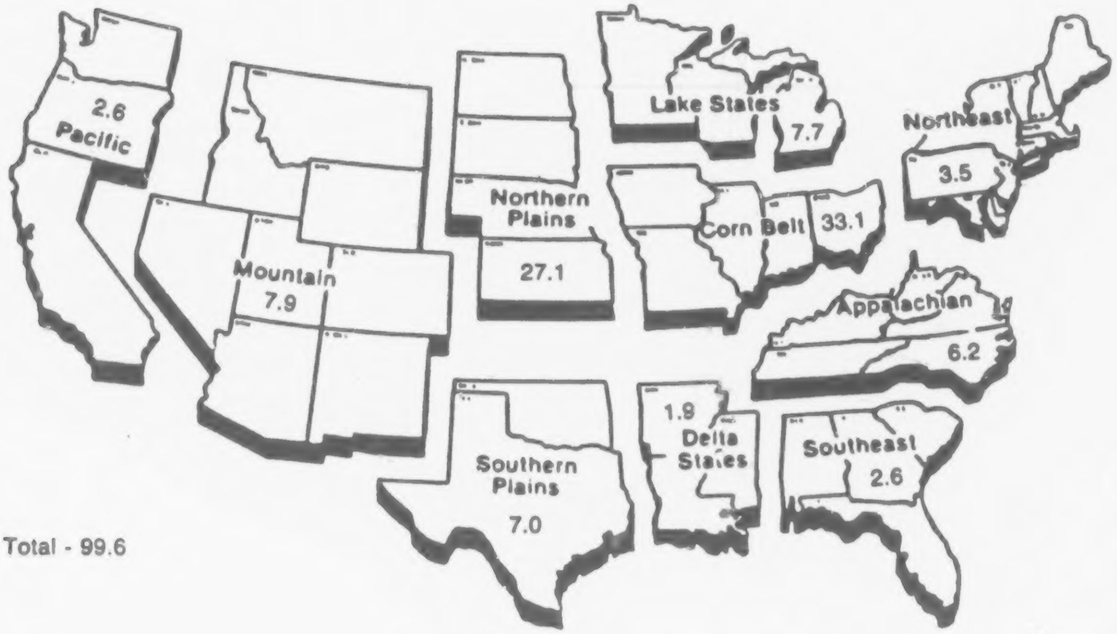
[2] Includes 5 tribal districts.

Soil Conservation Service.

1985 National Survey Conservation Tillage Practices
Conservation Tillage Information Center
National Association of Conservation Districts

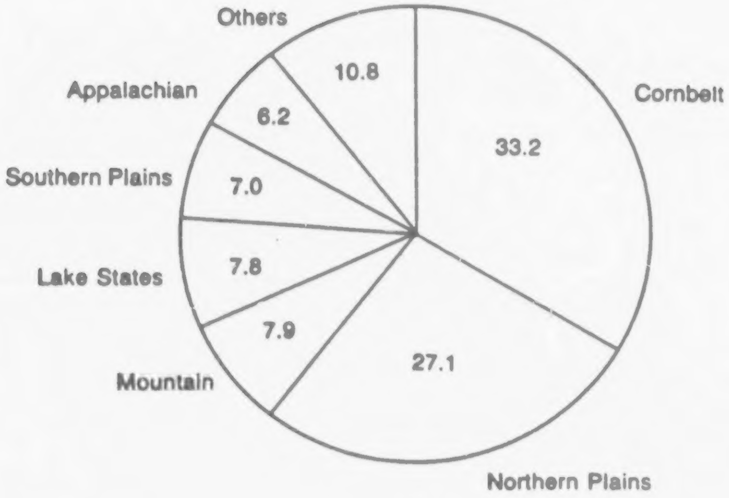
ALL CONSERVATION TILLAGE

ALL CROPS — ACRES IN MILLIONS

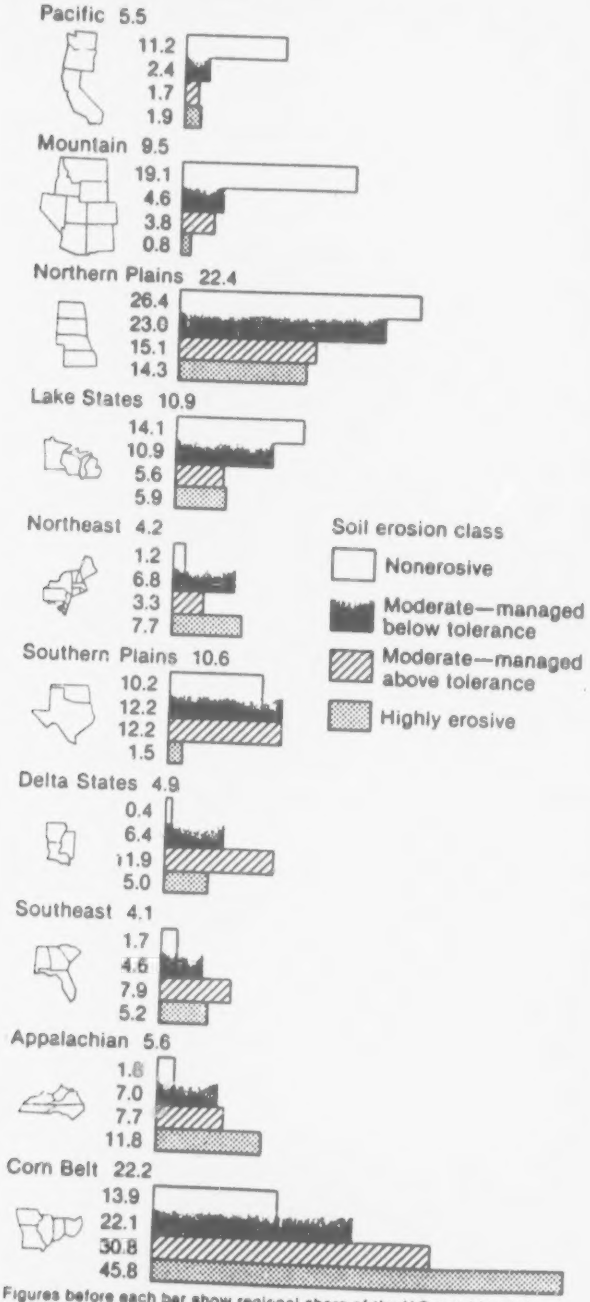

2.6
Pacific
Mountain
7.9
Northern
Plains
27.1
Lake States
7.7
Corn Belt
33.1
Northeast
3.5
Appalachian
6.2
Southern
Plains
7.0
1.9
Delta
States
Southeast
2.6

Total - 99.6

Distribution by Region • %



Regional Distribution of Cropland Acreage Erosion by Soil Erosion Class, United States, 1977



Figures before each bar show regional share of the U.S. total in each erosion class.

Figures above bars show each region's share of the U.S. cropland acreage.

Source: "Assessing Erosion on US Cropland--Land Management and Physical Features," Nelson L. Bills and Ralph E. Hemlich, Agriculture Economic Report No. 513, USDA, Economic Research Service, July 1984

SOIL CONSERVATION CONTACTS

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Hal Hiemstra
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Gary Nordstrom
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Garth Youngberg
(301) 441-8777

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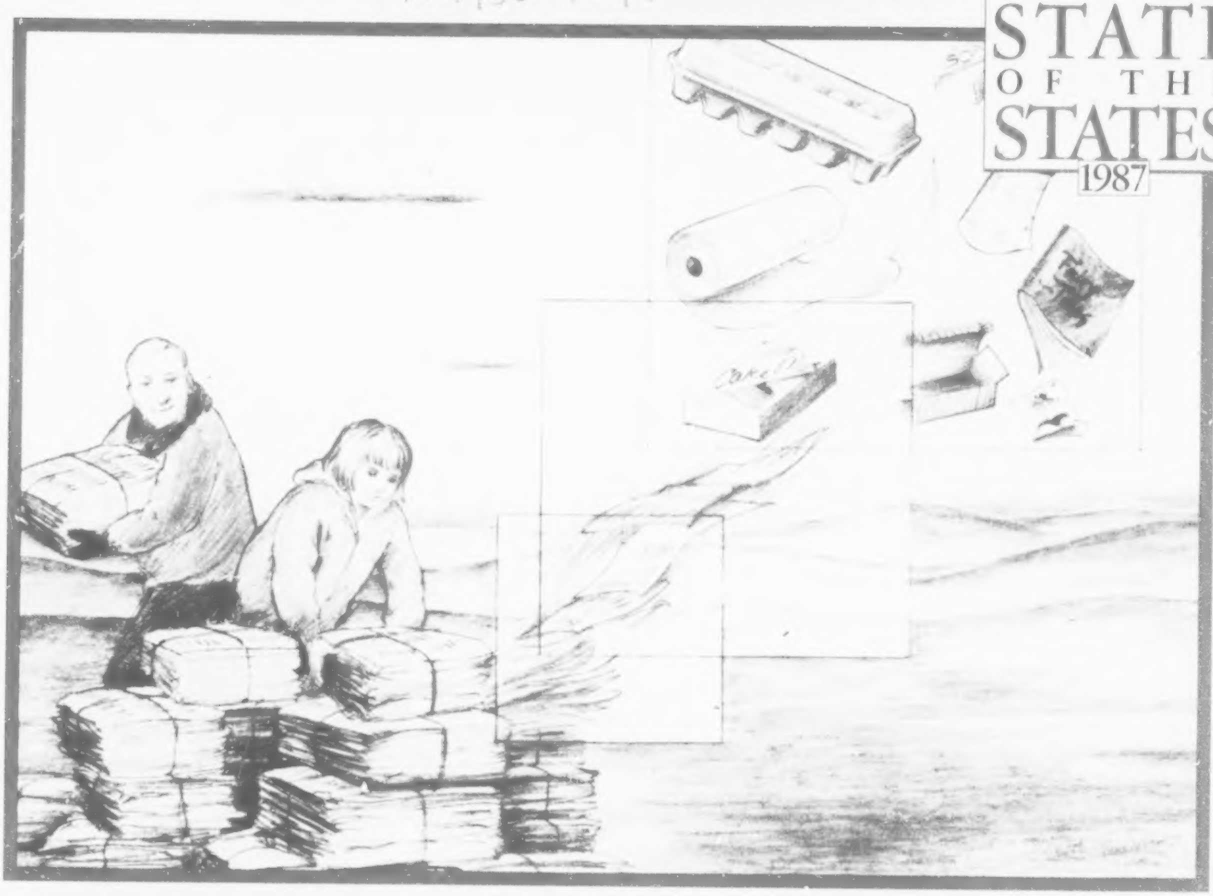
THE STATE OF THE STATES

1987



SOLID WASTE & RECYCLING

3

APPENDIX

FUND FOR RENEWABLE ENERGY & THE ENVIRONMENT

Prepared by:

The Fund for Renewable Energy and the Environment
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Suite 638
Washington, D.C. 20036
(202) 466-6880

Introduction

The Solid Waste Appendix, one of six appendices designed to supplement the data presented in the 1987 State of the States report, has been compiled for a more detailed look at solid waste management. In addition to providing in-depth data on the fifty state solid waste management programs, this appendix contributes to networking activities, information sharing and constructive debate on critical environmental policy questions.

Information from the main report--state rankings, primary map, brief text, and primary matrix--are presented in the forward section of the packet. Additional matrix information and maps, as well as solid waste management contacts are also included.

Solid waste disposal practices included in this report focus almost exclusively on landfill methods, the prevalent method of waste management. Budgetary information, state population, solid waste tonnage, and the numbers of landfills, surface impoundments, and land application units have been included to provide an overall sense of the size of the individual programs. Wherever possible, the information has been broken down according to the type of landfill in question, whether municipal, industrial or demolition debris, to avoid unnecessary and misleading groupings. Data not considered in the ranking of individual state programs such as information on the number of mass burn or incineration plants under construction or in operation within a given state has also been included as supplemental information for the reader.

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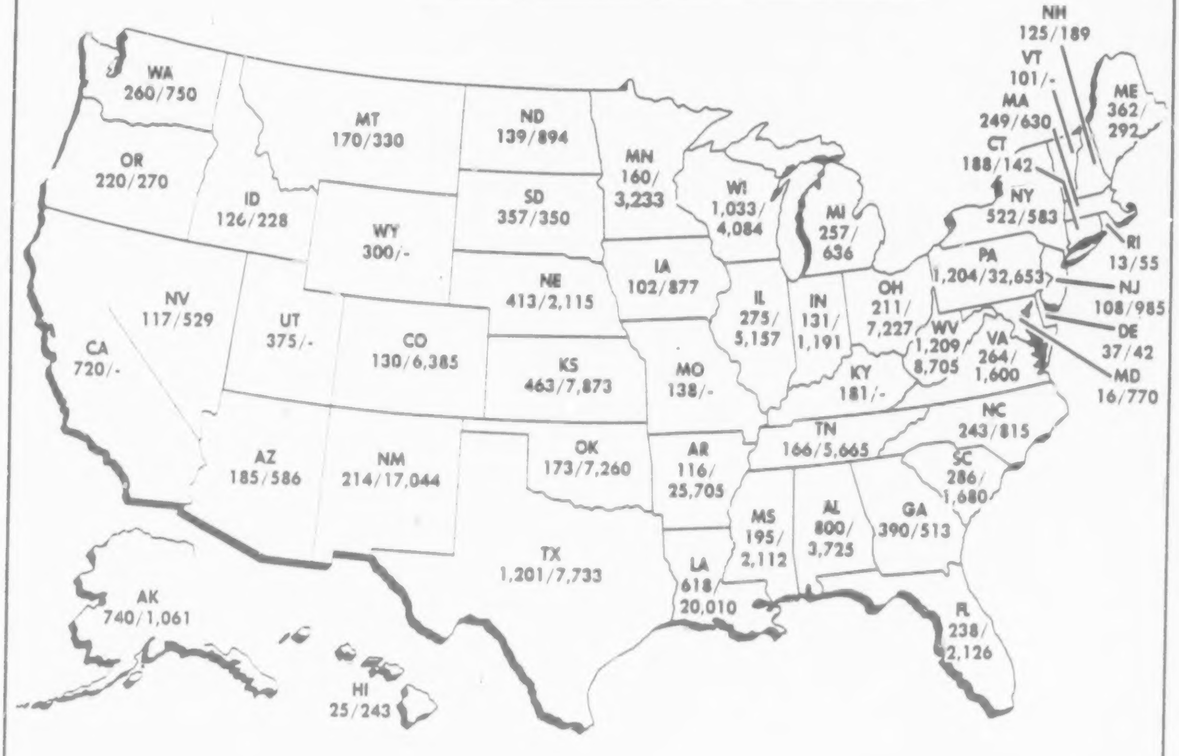
STATE ABBREVIATIONS

AL	ALABAMA
AK	ALASKA
AZ	ARIZONA
AR	ARKANSAS
CA	CALIFORNIA
CO	COLORADO
CT	CONNECTICUT
DE	DELAWARE
FL	FLORIDA
GA	GEORGIA
HI	HAWAII
ID	IDAHO
IL	ILLINOIS
IN	INDIANA
IA	IOWA
KS	KANSAS
KY	KENTUCKY
LA	LOUISIANA
ME	MAINE
MA	MASSACHUSETTS
MI	MICHIGAN
MN	MINNESOTA
MS	MISSISSIPPI
MO	MISSOURI
MT	MONTANA
NE	NEBRASKA
NV	NEVADA
NH	NEW HAMPSHIRE
NJ	NEW JERSEY
NM	NEW MEXICO
NY	NEW YORK
NC	NORTH CAROLINA
ND	NORTH DAKOTA
OH	OHIO
OK	OKLAHOMA
OR	OREGON
PA	PENNSYLVANIA
RI	RHODE ISLAND
SC	SOUTH CAROLINA
SD	SOUTH DAKOTA
TN	TENNESSEE
TX	TEXAS
UT	UTAH
VT	VERMONT
VA	VIRGINIA
WA	WASHINGTON
WV	WEST VIRGINIA
WI	WISCONSIN
WY	WYOMING

STATE PROGRAM RANKINGS: HOW STATES MEASURE UP

	AIR PROGRAMS	SOIL CONSERVATION PROGRAMS	GROUNDWATER PROGRAMS	HAZARDOUS WASTE PROGRAMS	SOLID WASTE PROGRAMS	RENEWABLE ENERGY & ENERGY CONSERVATION	TOTAL	RANK
AL	3	3	2	3	3	2	16	26
AK	7	3	3	2	2	1	18	25
AZ	7	3	7	5	2	3	27	19
AR	1	3	2	5	3	4	18	25
CA	10	3	7	9	9	10	48	2
CO	4	6	4	3	4	3	24	21
CT	9	6	9	4	9	7	44	4
DE	1	8	6	3	4	2	24	21
FL	7	4	9	8	6	7	41	7
GA	4	5	7	4	3	3	26	20
HI	4	4	3	2	2	4	19	24
ID	2	1	6	1	2	6	18	25
IL	7	9	5	7	7	6	41	7
IN	6	5	4	6	7	8	36	10
IA	5	10	5	5	7	7	39	8
KS	2	5	8	8	4	2	29	17
KY	7	3	1	6	8	3	28	18
LA	5	3	3	7	2	1	21	23
ME	3	6	7	6	6	8	36	10
MD	3	8	7	6	6	4	34	12
MA	6	4	8	9	6	8	41	7
MI	8	7	8	9	8	3	43	5
MN	5	6	5	9	9	4	38	9
MS	1	3	2	4	2	2	14	28
MO	5	6	7	8	1	4	31	15
MT	2	5	6	3	1	6	23	22
NE	4	6	6	2	6	7	31	15
NV	2	6	4	2	2	7	23	22
NH	6	5	5	7	5	4	32	14
NJ	9	6	7	10	10	5	47	3
NM	1	2	8	5	1	6	23	22
NY	5	5	10	8	8	7	43	5
NC	8	7	8	6	6	7	42	6
ND	1	3	4	2	3	3	16	26
OH	8	8	4	5	5	4	34	12
OK	5	5	5	4	7	3	29	17
OR	6	2	7	5	7	8	35	11
PA	8	6	5	5	3	5	32	14
RI	6	4	6	4	7	3	30	16
SC	6	5	7	5	2	6	31	15
SD	1	8	6	2	2	4	23	22
TN	3	3	4	7	5	7	29	17
TX	7	2	2	5	3	7	26	20
UT	3	4	3	2	1	3	16	26
VT	3	3	5	6	4	7	28	18
VA	8	7	6	2	3	7	33	13
WA	8	1	6	5	5	3	29	17
WV	2	5	2	4	1	1	15	27
WI	9	8	8	7	8	9	49	1
WY	1	3	8	1	2	1	16	26

SOLID WASTE LANDFILLS* AND LIQUID WASTE SITES**


WA
260/750
OR
220/270
CA
720/-
NV
117/529
ID
126/228
MT
170/330
WY
300/-
UT
375/-
AZ
185/586
CO
130/6,385
NM
214/17,044
ND
139/894
SD
357/350
NE
413/2,115
KS
463/7,873
OK
173/7,260
TX
1,201/7,733
MN
160/3,233
IA
102/877
MO
138/-
AR
116/25,705
LA
618/20,010
WI
1,033/4,084
IL
275/5,157
MI
257/636
IN
131/1,191
KY
181/-
TN
166/5,665
MS
195/2,112
AL
800/3,725
GA
390/513
FL
238/2,126
OH
211/7,227
WV
1,209/8,705
VA
264/1,600
NC
243/815
SC
286/1,680
PA
1,204/32,653
NY
522/583
NH
125/189
VT
101/-
MA
249/630
CT
188/142
ME
362/292
RI
13/55
NJ
108/985
DE
37/42
MD
16/770
AK
740/1,061
HI
25/243

*Subtitle D landfills (solid waste landfills) contain primarily municipal waste with some industrial and demolition debris waste as well. Subtitle D landfills do not include private industrial landfills.

16,416 / 185,053 — total number of landfills / total number of liquid waste sites; - no data

**Liquid waste sites (surface impoundments) primarily contain gas and oil waste but also include municipal, industrial, agricultural, and mining waste.

SOURCE: EPA

SOLID WASTE MANAGEMENT--THE BIG PICTURE

Americans produce 150 million tons of municipal trash each year--nearly 3.5 pounds per person per day. According to Franklin Associates, Inc., 37 percent of this residential and commercial waste is paper. Another 18 percent is yard waste, 8 percent is food waste, 10 percent is glass, 10 percent is metals, 7 percent is plastic, and the remainder is wood, rubber, textiles and miscellaneous inorganics. Currently about 8 percent of municipal trash is recycled, 5 percent is incinerated, and 87 percent is disposed in landfills.

Industry produces an additional amount of waste estimated to be as much as 350 million tons per year. Most industrial wastes are dumped in private landfills that are unregulated and unmonitored.

The first signs of a mounting solid waste crisis came in the early 1960s when increasing volumes of trash and unregulated dumping raised concerns about serious health and environmental threats. In response, Congress passed the Solid Waste Disposal Act of 1965. The act provided assistance to states undertaking research, surveys, and innovative solutions for waste management. Five years later, uncontrolled dumping was still the norm. Congress then passed the Resource Recovery Act of 1970 to promote state action. Additional funds for research and construction of advanced design landfills were provided and the federal government kept an advisory role. Most significantly, the act officially identified recycling as an economical and efficient means of reducing and managing waste for the first time.

A few years later, in 1976, Congress passed the Resource Conservation and Recovery Act to address the growing complexity of waste management problems. Nearly 200,000 surface impoundments--pits, ponds, and lagoons containing industrial, agricultural, and municipal liquid wastes--were also covered by the law. Most importantly, the law encouraged states to develop solid waste management plans and established minimum siting and operating standards for disposal facilities. As of October 1985, twenty-two states had solid waste management plans fully approved by EPA. But federal assistance and funding originally promised were not available.

In the past few years federal support has swung behind the option of burning trash to create energy. But controversy over pollution from incineration plants has spurred a new wave of alternative solid waste discussion. Increasingly, state and city governments are considering new solid waste management systems that include large scale recycling, composting, and refuse-derived fuel plants. Alternative waste management advocates claim that landfilling and incineration can be minimized by programs which encourage 5-10 percent waste reduction, recycling 50 percent of the waste stream, and 25-30 percent composting.

SOLID WASTE MANAGEMENT SNAPSHOT

The best working model for solid waste management programs and policies is New Jersey. Despite a heavy reliance on construction of incineration plants, New Jersey is the first state to target 25 percent recycling for its counties, and require ten year plans from its twenty-two waste districts. The state also conducts frequent inspections and substantial monitoring for groundwater contamination at landfill sites.

RANKING NOTES

States were ranked on a scale of one to ten on the strength of their environmental policies. The rank is not meant to judge particular environmental conditions in each state, but considers environmental problems as a need for program strength. The rankings were based on a number of factors in managing solid waste and reducing the threats of pollution of air, soil, and water by solid waste facilities. Particular attention was given to recycling as the most cost-effective and environmentally benign method of waste management.

Landfill disposal, the traditional waste management strategy, was assessed for enforceable protection requirements and standards. Also considered were the extent and frequency fo monitoring programs (including groundwater, surface water, air, and methane monitoring), and the total number of inspections for 1984. These measurs were compared to the total number of solid waste landfills and estimated tonnage of solid waste generated by each state.

State recycling programs were ranked according to the extent of legislative and program activity, focusing on both waste reduction incentives and market development. Indicators of a comprehensive recycling program included: mandated waste reduction, litter control legislation, bottle bills, recycling goals as a percentage of the total waste stream, the amount and dependability of funding, a statewide versus local approach, tax incentives, state procurement of recycled products, and the diversity of recycling programs to include used oil and tires as well as metals and paper.

Summary of State Solid Waste Management Activity

- despite a decade of legislative activity only three states have mandated waste reduction;
- nine states have passed "bottle bill" legislation to encourage recycling equipment, and five states are doing research into uses of recycled materials;
- twenty-two staes have EPA-approved solid waste management plans;
- six states have partial approval from EPA for solid waste management plans;
- ten states have adopted plans and have submitted them to EPA for review;
- two states have submitted no plan

SOLID WASTE MATRIX

	SOLID WASTE MANAGEMENT PLAN 1-4*	REGULATIONS FOR LANDFILL SAFETY AND CONTROL 1-4*	RECYCLING PROGRAM 1-4*	TOTAL MONITORING OF GROUNDWATER	TOTAL INSPECTIONS*	FREQUENCY OF INSPECTIONS	NUMBER OF GROUNDWATER VIOLATIONS*	NUMBER OF SUBTITLE D LANDFILLS	NUMBER OF SUBTITLE D SURFACE IMPOUNDMENTS	ESTIMATED SOLID WASTE TONNAGE tons/day*
AL	1	3	4	134	730	twice/yr	30	800	3,725	6,983
AK	5	3	3	20	550	< once/2 yrs	7	740	1,061	875
AZ	1	4	4	7	142	once/yr	5	185	586	5,343
AR	1	4	3	21	254	twice/yr	7	116	25,705	4,111
CA	1	1	2	265	2,467	once/yr	24	720	—	44,839
CO	3	2	4	36	42	twice/yr	16	130	6,385	5,562
CT	1	1	2	115	263	twice/yr	87	188	142	5,520
DE	2	3	3	12	58	once/yr	6	37	42	1,073
FL	1	1	3	174	738	twice/yr	76	238	2,126	19,208
GA	1	3	4	26	710	once/yr	3	390	513	10,215
HI	4	4	3	1	106	> 4x/yr		25	243	1,818
ID	3	3	4	8	361	twice/yr	6	126	228	1,752
IL	1	3	2	246	744	once/yr	76	275	5,157	20,144
IN	1	3	3	70	1,572	> 4x/yr	8	131	1,191	9,622
IA	1	2	2	88	432	—	—	102	877	5,093
KS	5	1	4	42	963	twice/yr		463	7,873	4,267
KY	1	1	2	92	1,468	> 4x/yr	—	181	--	6,515
LA	1	3	4	—	—	—	—	618	20,010	7,809
ME	3	1	3	61	475	twice/yr	115	362	292	2,023
MD	4	3	3	63	—	> 4x/yr	1	16	770	7,611
MA	1	3	2	43	87.	once/yr	136	249	630	10,147
MI	1	2	1	99	780	4x/yr	203	257	636	15,881
MN	1	1	1	124	850	> 4x/yr	103	160	3,233	7,284
MS	1	3	4	6	481	4x/yr		195	2,112	4,547
MO	3	—	4	—	—	—	—	138	—	8,764
MT	3	4	4	20	240	twice/yr		170	330	1,442
NE	2	1	2	20	45	once/yr	4	413	2,115	2,811
NV	4	3	4	0	46	once/yr		117	529	1,594
NH	3	3	3	33	421	4x/yr	52	125	189	1,710
NJ	4	1	1	98	604	> 4x/yr	30	108	985	13,151
NM	5	4	4	1	409	twice/yr	4	214	17,044	2,492
NY	4	1	1	99	1,110	once/yr	315	522	583	31,036
NC	1	2	3	79	85	once/2 yrs	1	243	815	10,789
ND	2	3	4	18	573	twice/yr		139	894	1,201
OH	1	3	2	53	—	4x/yr	12	211	7,227	18,816
OK	1	1	3	107	677	twice/yr	13	173	7,260	5,772
OR	2	3	1	20	300	once/yr	4	220	270	4,680
PA	1	4	1	195	2,120	> 4x/yr	67	1,204	32,653	20,827
RI	3	3	3	13	156	other	8	13	55	1,684
SC	4	4	3	0	1,558	4x/yr	124	286	1,680	5,775
SD	3	4	4	10	410	4x/yr	12	357	350	1,236
TN	1	3	3	70	930	4x/yr	23	166	5,665	8,525
TX	1	1	4	93	—	once/yr	27	1,201	7,733	27,981
UT	4	—	4	—	—	—	—	375	—	2,891
VT	3	4	3	77	490	> 4x/yr		101	—	928
VA	4	4	3	92	1,064	4x/yr	52	264	1,600	9,863
WA	2	4	2	25	26	< once/2 yrs	69	260	750	7,611
WV	4	4	3	31	730	once/yr	8	1,209	18,705	3,416
WI	2	2	1	148	2,005	once/yr	48	1,033	4,084	8,341
WY	4	4	4	99	307	once/yr	7	300	—	894

FOOTNOTES TO THE SOLID WASTE MATRIX

[1] Data as of June 1986. Symbols mean:
1=EPA approved
2=EPA partially approved
3=adopted plans and submitted them for EPA review
4=drafts of state plan are under state or EPA review
5=has not submitted a plan
(source: US EPA, State Programs Branch, Office of Solid Waste, Washington, DC, 1986).

[2] 1=examination of31specified landfill requirements: all ormost requirements were explicitly included in state regulations
2=approximately half the 31 requirements are specifically included under state regulations with a few requirements not enforceable under any policies.
3=fewrequirements are specifically includedin state legislation, though all or most are enforceable under general standards and policies.
4=hardly any enforceable requirements
(source: US EPA, "State Subtitle D Program Questionaires," unpublished, Office of Solid Waste, Washington, DC, 1986).

[3] Symbols mean:
1=the most comprehensive recycling programs with respect to state funding, market development and mandating waste reduction. New York's and Pennsylvania's proposed programs are included in this category.
2=state funded programs with an emphasis on recycling legislation and market development.
3=state programs with 0 or limited funding but nevertheless have taken a step, or several steps, towards 1) reducing litter, and/or 2) developing markets for recycled products.
4=state programs with zero or limited funding that restrict efforts to some state purchase of recycled paper, a recycling hotline, etc., or leave recycling to the private sector.
(source: information gathered primarily from back issues of Resource Recycling, and Biocycle magazines).

[4] Represents the frequency with which 60% of the landfills are inspected in each state. "<"=less than; ">"=greater than.
(source: US EPA, "State Subtitle D Program Questionnaires," unpublished, Office of Solid Waste, Washington, DC, 1986).

[5] Based on 3.5 pounds per person per day multiplied by state population.
(source: National Solid Waste Management Assoc., Basic Data: Solid Waste Amounts, Composition and Management Systems, Washington, DC, Oct. 1985).

1984 SOLID WASTE BUDGETS

TABLE I

STATE	TOTAL BUDGET	PERCENT STATE FUNDING	PERCENT FEDERAL FUNDING	PERCENT LICENSE OR USER FEES	PERCENT OTHER
AL	$540,000	64	31	5	0
AK	$290,000	100	0	0	0
AZ	$660,000	28	72	0	0
AR	$157,471	34	50	16	0
CA	$9,476,255	N/A	0	N/A	0
CO	$70,000	65	32	3	0
CT	$760,000	90	10	0	0
DE	$9,346,656*	0	0	0	0
FL	$698,333	100	0	0	0
GA	$669,662	94	6	0	0
HI	$75,000	100	0	0	0
ID	$160,663	83	0	0	17
IL	$300,000	100	0	0	0
IN	$1,296,936	33	67	0	0
IA	$330,457	100	0	0	0
KS	N/A	N/A	N/A	N/A	N/A
KY	N/A	N/A	N/A	N/A	N/A
LA	N/A	100	0	0	0
ME	$300,000	95	5	0	0
MD	$475,854	100	0	0	0
MA	$278,813	30	70	0	0
MI	$2,552,300	85	15	0	0
MN	$990,000	85	10	5	0
MS	$162,975	100	0	0	0
MO	N/A	N/A	N/A	N/A	N/A
MT	N/A	72	28	0	0
NE	$180,000	58	0	42	0
NV	N/A	100	0	0	0
NH	$376,979	80	19	1	0
NJ	$4,667,000	79	1	20	0
NM	N/A	100	0	0	0
NY	N/A	100	0	0	0
NC	N/A	N/A	N/A	N/A	N/A
ND	$255,000	25	75	0	0
OH	$1,111,695	N/A	N/A	N/A	N/A
OK	$1,639,368	100	0	0	0
OR	$909,515	89	8	3	0
PA	$675,000	100	0	0	0
RI	$120,000	N/A	N/A	N/A	N/A
SC	$178,000	91	9	0	0
SD	$15,000	100	0	0	0
TN	N/A	100	0	0	0
TX	N/A	100	0	0	0
UT	$250,000	100	0	0	0
VT	$160,000	85	0	0	0
VA	$250,000	100	15	0	0
WA	$548,281	100	0	0	0
WV	$172,000	81	0	0	0
WI	$981,659	230	4	15	0
WY	N/A	N/A	N/A	N/A	N/A

STATE SOLID WASTE MANAGEMENT PROGRAMS

TABLE II

STATE	Monitoring at Landfills: GROUNDWATER	SURFACE WATER	AIR EMISSIONS	METHANE	Solid Waste Tonnage Received: LESS THAN 30 TONS/DAY	30-500 TONS/DAY	MORE THAN 500 TONS/DAY	Mass Burn Plants: OPERATIONAL	UNDER CONSTRUCTION OR PERMITTING
AL	120M,10I,4D	5M,10I	0	5M	40M,80I,300D	70M,60I,150D	14M,36I,50D	1	0
AK	11M,7I,2D	3M, unk I	0	unk M	440M,268I,21D	10M	1M	1	0
AZ	7M	0	0	3M	17M	72M	12M	0	0
AR	19M,2I	16M,2I	0	0	65M,26I,4D	21M	0	3	0
CA	200M,60I,5D	250M,70I,15D	250M,80I,5D	150M,60I,5D	161M,65I,150D	168M,30I,45D	53M,5I,5D	0	7
CO	31M,3I,2D	9M,1D	0	16M	71M	45M,3I,1D	8M,2D	0	0
CT	65M,28I,20D	82M,32I,25D	1M,2D	20M	51M,21I,49D	37M,11I,11D	4M	1	3
DE	3M,9I	3M,3I	0	3M,1I	15D	8I,7D	3M,1I,3D	0	1
FL	136M, 5I	48M	0	2M	54M,13I,10D	65M,1I	21M	4	3
GA	25M,1I	90M,2I,2D	0	8M	151M,75I,79D	53M,20I	11M,1D	0	1
HI	1M	0	0	0	12M,1D	10M	1M	0	0
ID	7M,1I	1M	0	2M,1I	88M,11I,7D	17M,1I	1M	1	0
IL	171M,65I,10D	4M,6I	0	0	N/A	N/A	N/A	1	0
IN	64M,5I,1D	0	0	20M	30M,1I,10D	72M,6I,4D	8M	0	2
IA	79M,8I,1D	47M	0	1M	26M,4I,8D	52M,6I	1M	0	0
KS	37M,5I	6M,1I,1D	0	3M	93M,50I,267D	34M,17I	2M	0	0
KY	82M,10I	19M,5I	0	82M	114M,53I	7M,2I	2M,3I	•	•
LA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0
ME	45M,11I,1D	20M,9I,1D	0	3M	286M,3I,29D	14M,19I,3D	0	1	1
MD	43M,15I,5D	43M,15I,5D	0	0	10M,17I,12D	25M,4I	8M	1	1
MA	40M, unk I	2M, unk I	0	N/A	118M,unk I,36D	71M,4D	6M	3	2
MI	50M,29I,20D	30M,10I,3D	0	0	50M,15D	37M,39I,6D	10M	0	0
MN	95M,27I,2D	5M,3I	2M	2M	61M,20I,22D	41M,7I,5D	4M	2	1
MS	3M,3I	0	0	0	107M,10I,8D	5M	0	1	0
MO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	1
MT	20M, unk I	unk I	unk I	1M, unk I	130M,unk I,30D	10M,unk I	unk I	1	0
NE	20M	0	0	0	363M,15I	5M	2M	0	0
NV	0	0	0	0	57M	48M,1D	11M	0	0
NH	30M,3D	30M,3D	0	3M	N/A	N/A	N/A	3	2
NJ	72M,17I,9D	5M,2I	5M	5M	45M,17I,13D	13M,5D	14M	0	5
NM	1M	0	0	0	182M	21M,4D	7M	0	0
NY	84M,12I,3D	20M,8I,3D	0	47M	199M,14I,89D	160M,10I,10D	40M	5	8
NC	74M,5I	85M	85M	0	12M,25I,81D	114M,5I	6M	1	0
ND	7M,11I	0	0	0	98M,6I,17D	13M,5I	0	0	1
OH	6M,7I,N/A D	N/A	N/A	N/A	N/A	N/A	N/A	1	0
OK	85M,12I,10D	15M,6I	0	5M	66M,12I,9D	23M,[illegible]D	46M,5D	2	0
OR	15M,3I,2D	8M,2I	0	0	89M,94I,9D	18M,5I,3D	2M	0	0
PA	103M,62I,3D	32M,12I	0	3M	55M,935I,11D	58M,119I	18M,8I	1	3
RI	12M,1D	12M,1D	0	0	9M,1D	2M	1M	0	1
SC	0	4M	0	0	10M,62I,43D	76M,23I	0	0	0
SD	10M	0	0	0	0	195M,150D	5M,7I	0	0
TN	60M,10I	30M,5I	C	0	25M,30I,7D	71M,16I,7D	10M	4	0
TX	79M,unk I,14D	unk I	unk I	unk I	636M,unk I,64D	266M,unk I,64D	47M,unk I,4D	2	0
UT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	1
VT	70M,7I	71M,7I	0	0	62M,8I,22D	9M	0	0	1
VA	62M,21I,9D	45M,9I,9D	1M	5M,3D	70M,22I,28D	71M,26I,15D	14M,3I,8D	7	1
WA	20M,5I	30M	10M	10M	120M,unk I&D	30M,unk I&D	7M,unk I&D	0	0
WV	6M,25I	25M,10I	0	0	165M,308I,101D	35M,45I	5I	0	0
WI	92M,50I,6D	10M,1I	4M	16M,1I	868M,24I,37D	40M,35I,7D	8M,4I	1	0
WY	24M,75I	0	0	6M	N/A	N/A	N/A	0	0

I=Industrial Landfills
M=Municipal Landfills
D=Demolition Debris Landfills
unk=unknown

• = Kentucky has one mass burn plant that will be operational pending modifications and another under construction or permitting that is on

LANDFILL INSPECTIONS

TABLE III

STATE	Number of Inspections: MUNICIPAL LANDFILLS	Number of Inspections: INDUSTRIAL LANDFILLS	Number of Inspections: DEMOLITION DEBRIS LANDFILLS	Frequency of Inspections: NEVER	Frequency of Inspections: LESS THAN ONCE EVERY TWO YEARS	Frequency of Inspections: ONCE EVERY TWO YEARS	Frequency of Inspections: ONCE A YEAR	Frequency of Inspections: TWICE A YEAR	Frequency of Inspections: FOUR TIMES A YEAR	Frequency of Inspections: MORE THAN FOUR TIMES A YEAR	Frequency of Inspections: OTHER
AL	500	50	180					100%I&D	100% M		
AK	225	300	25	5%M,35%I	20%M,50%I,90%D	25%M,5%I	35%M,5%I,10%D	5%M&I	10%M		
AZ	112	0	30		100%D		100%M				
AR	214	31	9				20%M,I&D	80%M,I&D			
CA	2,237	100	130	7%M	8%M	19%M,5%I	16%M,10%I	14%M,35%I	11%M,30%I	25%M,20%I	
CO	39	2	1	20%M	20%M	25%M	30%M	5%M,100%I&D			
CT	135	35	88	69%I			9%M&D,23%I	71%M&D,8%I	15%M&D	5%M&D	
DE	6	27	25			1%D	99%M,I&D	1%M&I			
FL	574	22	142	100%D					27%M	73%M	
GA	479	48	133				50%M&D,70%I	30%M&D,25%I	20%M&D,5%I		
HI	106	0	0	3%M	3%M		3%M			76%M	
ID	332	13	15	1%M,3%I			92%I	75%M,100%D	15%M		9%M
IL	322	386	35				75%M,100%D	25%M		100%I	
IN	1,320	94	168							100%M,I&D	
IA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
KS	514	134	315				82%D	100%I,13%D	100%M		
KY	N/A	N/A	N/A						100%D	100%M&I	
LA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ME	330	45	50			45%M,50%D	20%M,15%I,40%D	15%M,50%I,10%D	15%M,10%I	5%M,15%I	
MD	734	N/A	25							100%M,I&D	
MA	35	0	2		13%M	15%M,90%D	30%M,10%D	25%M	5%M	2%M	
MI	350	190	240				20%D	5%M&I	90%M&I,30%D	5%M&I	
MN	700	50	[illegible]				25%I	50%M&D	25%I&D	100%M,25%D	
MS	337	47	35					25%I,50%D	100%M,75%I		50%D
MO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MT	200	10	30	100%I		5%M,25%D	50%M,75%D	25%M	15%M	5%M	
NE	30	10	5	83%M	5%M,25%I,10%D	1%M	5%M,65%I,90%D	1%M,10%I			
NV	45	0	1	5%M	15%M	20%M	47%M,100%D	10%M	3%M		
NH	350	10	61					10%M&D	90%M&D,100%I		
NJ	430	100	24							100%M,I&D	
NM	105	0	4					75%M,50%D	25%M,50%D		
NY	991	35	94	25%D	19%M,15%I&D	20%M,32%I,16%D	20%M,37%I,13%D	24%M,3%I,20%D	3%M,4%D	14%M,8% I,2%D	
NC	35	0	0	100%I&D		100%M					
ND	545	15	13		5%D	60%D	5%M,35%I,25%D	50%I,10%D	45%M,15%I	50%M	
OH	900	300	N/A						100%M&I		
OK	540	48	89				50%I	75%M,50%I,100%D	25%M		
OR	173	96	31			10%M,25%I,7%D	50%M,60%I,35%D	25%M&D,15%I	10%M,8%D	5%M ,25%D	
PA	1,356	720	44						100%D	10 0%M&I	
RI	144	N/A	12								100%M&D
SC	854	416	288				1%D	20%D	6%M,72%I,21%D		94%M,28%I,58%D
SD	350	10	50			100%D	75%M		25%M,100%I		
TN	625	234	71						100%M,I&D		
TX	2,357	N/A	262		90%I	10%I	66%M,47%D	34%M,53%D			
UT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VT	355	25	110			12%I	36%I	10%M,12%I	20%M,30%I	70%M,10%I, 100%D	
VA	736	168	160	1%M,6%I,12%D	2%I		7%M,21%I,20%D	10%M,8%I,25%D	33%M,30%I,25%D	49%M,33%I ,18%D	
WA	24	2	0		40%M,100%I&D	30%M	15%M	10%M	5%M		
WV	200	200	330	10%M,2%I,50%D	5%I	5%M&I	5%M,30%I&D	10%M,20%M,20%D	35%M&I	40% M,3%I	
WI	1,700	230	75			10%M,3%I,23%D	75%M,40%I,57%D	3%M,14%I,9%D	3%M,19%I,5%D	9%M,24% I,6%D	
WY	143	145	19				75%M,100%I&D	20%M	5%M	5%M	

I=Industrial Landfills
M=Municipal Landfills
D=Demolition Debris Landfills

11

SUBTITLE D LANDFILL REQUIREMENTS

TABLE IV-a

Requirements Specifically Included in State Regulation

STATE	NATURAL LINERS	SYNTHETIC LINERS	LOCATION STANDARDS	LEACHATE COLLECTION AND REMOVAL	LEACHATE ANALYSIS	LEACHATE TREATMENT	GROUNDWATER PROTECTION STANDARD	GROUNDWATER MONITORING	CORRECTIVE ACTION FOR GROUNDWATER CONTAMINATION	AIR PROTECTION STANDARD	AIR EMISSIONS MONITORING	METHANE MONITORING	METHANE CONTROLS	CORRECTIVE ACTION FOR OFF-SITE METHANE MIGRATION	SURFACE WATER PROTECTION STANDARDS	SURFACE WATER MONITORING
AL			x				I,D	x		x		I,D	I,D			
AK			x		x		x			x					x	
AZ			x				x			x					x	
AR			x													
CA	I,M	I,M	I,M	I,M	I,M	I,M	I,M	I,M	I,M	I	I	x	x	x	x	I,M
CO			x					x		x	x	x	I			
CT			x				x	x	x			x	x	x	x	x
DE	I,M	I,M		I,M	I,M	I,M		I,M				I,M	I,M			
FL	I	I	I,M	I,M	I,M	I,M	I,M	I,M	I,M				M	I,M	I,M	I,M
GA																
HI								M								
ID			x	x		x		x					x			
IL	x						x	x							I,M	
IN			x							M		x	x	x	x	
IA			x	x		x	x	x							x	
KS			x				I,M	I,M	I,M	x		I,M	x	x	I,M	
KY	I,M	I,M	x	I,M		I,M	x	I,M		I,M			I,M		x	
LA	I,M	I,M	I,M	I,M				I,M			I,M		I,M		I,M	
ME	I,M		x	x		I,M	x	I,M	x	x			I,M	I,M	x	x
MD							M,D	M,D	M	M,D			M,D		M,D	M,D
MA			x													
MI	I,M	I,M	x	I,M	I		x	x				I,M	I,M		x	
MN			I,M				I,M	I,M	I,M	I,M		I,M		I,M	I,M	I,M
MS	I,M		x				x			x			I,M	I,M	I,M	
MO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MT			M,D					M								
NE			I,M	I,M		I,M	I,M	I,M	M			I,M	I,M	I,M	I,M	
NV			x				x			x		x			x	
NH								x	x							
NJ	M,D	x	x	x	x	x	x	x	x	x	I,D	x	x	x	x	I
NM			x												x	
NY	I,M	I,M	x	I,M	I,M	I,M	x	I,M	x				I,M	x	x	I,M
NC							I,M	I,M	I,M	x	x	x			x	x
ND							x	x		x			M		x	x
OH			I,M			I,M		I,M							I,M	
OK	M	M	x	M,D	x	x	x	x	x	x		I,D	x	M	x	x
OR			x	x			x	x	x				x		x	
PA	x	x	x	x				x					x	x		
RI			x				x	x	x	x			x	x	x	x
SC								I,M								
SD			x							I					x	
TN			x			x	x	x	x	x					x	x
TX	M,D	M,D	x	M,D			M,D	x	M,D	M,D		M,D	M,D	M,D	x	
UT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VT			I,M					I,M								I,M
VA																
WA				M			x			x			M		x	
WV															x	
WI			x			x	x	x	x	x		x	x	x	x	x
WY							x		x	x					x	

I=Industrial Landfills
M=Municipal Landfills
D=Demolition Debris Landfills
x=Industrial, Municipal, and Demolition Debris Landfills

SUBTITLE D LANDFILL REQUIREMENTS

TABLE IV-b

Requirements Specifically Included in State Regulation

STATE	CORRECTIVE ACTION FOR SURFACE WATER CONTAMINATION	RUN-OFF COLLECTION AND REMOVAL	RUN-OFF ANALYSIS	RUN-OFF TREATMENT	RUN-ON CONTROL	RESTRICTIONS ON RECEIPT OF LIQUID WASTES	RESTRICTIONS ON TYPES OF SUBTITLE D WASTES RECEIVED	DAILY COVER	ENDANGERED SPECIES CRITERIA	DISEASE VECTOR CRITERIA	SAFETY CRITERIA: BIRD HAZARDS	SAFETY CRITERIA: UNCONTROLLED ACCESS	CLOSURE STANDARDS	POST-CLOSURE MONITORING	FINANCIAL RESPONSIBILITY
AL					x			x	x	x	x	x	x	x	
AK						x	x	x		x	x	x	x	x	
AZ								M		x					
AR					x	x	x	M		x		x	x	x	x
CA	I,M	I,M	I,M	I,M	I,M	x	x	I,M	x	x	x	x	I,M	I,M	I,M
CO		x			x			I,M		x	x	x	x	x	
CT	x				x	x	x	I,M	x	x	x	x	x	x	x
DE		I,M					I,M	I,M				I,M	I,M	I,M	
FL	I,M	I,M	I,M	I,M	I,M	D.	I,M	I,M	I,M	I,M	I,M	I,M	I,M	I,M	I,M
GA							x	I,M		x		x	x	x	
HI							M	M		M			M		
ID		x			x	x		x		x		x			
IL							x	x		x	x	x	x	x	x
IN	x	x				x		I,M	x	x	x	x	x	I,M	
IA					x		x	x		x	x	x	x	x	
KS	x	x	x	x			x	x	x	x	x	x		x	x
KY		I,M			x	I,M	x	I,M	x	x		x	x	x	x
LA					I,M	I,M	x	I,M	I,M						I,M
ME	x	x	x		x	x	x	x	x	x	x	x	x	x	
MD	M				M,D	M,D		M,D	M,D	M,D		M,D	M,D		
MA							x	x		M		x	x		•
MI		x			x	x	D	I,M			x	x	x	x	x
MN				I,M	I,M	I,M	I,M	I,M	I,M	I,M	I,M	I,M	I,M	I,M	
MS							x	x	I,M	x	I,M	x	x	x	
MO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MT								M				M			
NE	I,M				I,M	I,M	I,M	I,M	I,M	I,M	I,M	I,M	I,M	I,M	I,M
NV		x					x	x		x	x	x	x		
NH						x	x	x	x	x	x	x			
NJ	x	x	x	x	x	x	x	x	x	x	M,D	I,D	x	x	x
NM					x			x					x		
NY	x		I,M		I,M	x	x	I,M	x	x	x	x	x	x	x
NC						x	x	x	x	x	x	x	x	x	
ND		x			x	x	x	x		x	M	x	x		
OH	I,M					I,M	I,M	I,M	I,M	I,M	I,M	I,M	I,M	I,M	
OK	x	x	x	x	x	M,D	x	M,D		x	x	x	x	x	x
OR		x							x		x		x	x	x
PA								x							
RI	x	x			x	x	x	x	x	x	x	x	x		
SC					I,M	I,M	I,M	I,M				I,M	I,M		
SD							I	x				x	x		
TN	x				x	x	x	x				x	x	x	x
TX	M,D				x	M,D	M,D	x	x	x	x	M,D	x	x	x
UT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VT						x	x	x				I,M			I,M
VA								x					x		
WA								M							
WV								M	M,D	M,D	M,D				
WI	x				x			x	x	x	x	x	x	x	x
WY								x		x					

I=Industrial Landfills
M=Municipal Landfills
D=Demolition Debris Landfills
x=Industrial, Municipal, and Demolition Debris Landfills
• = Limited to private facilities

SUBTITLE D LANDFILL REQUIREMENTS

TABLE IV-c

Requirements Enforced Under General Standards and Policies

STATE	CORRECTIVE ACTION FOR SURFACE WATER CONTAMINATION	RUN-OFF COLLECTION AND REMOVAL	RUN-OFF ANALYSIS	RUN-OFF TREATMENT	RUN-ON CONTROL	RESTRICTIONS ON RECEIPT OF LIQUID WASTES	RESTRICTIONS ON TYPES OF SUBTITLE D WASTES RECEIVED	DAILY COVER	ENDANGERED SPECIES CRITERIA	DISEASE VECTOR CRITERIA	SAFETY CRITERIA: BIRD HAZARDS	SAFETY CRITERIA: UNCONTROLLED ACCESS	CLOSURE STANDARDS	POST-CLOSURE MONITORING	FINANCIAL RESPONSIBILITY
AL	x	x	x	x		x	x								
AK	x	x	x	x	x				x					x	x
AZ						D	D	I,D	x		x	x	x	x	
AR	x	x	x	x				I,D	I,M		x				
CA	D	D	D	D	D			D					D	D	D
CO	x		x			D	D	D							
CT		x	x	x				D							
DE	I,M		I,M	I,M	I,M	x	D	D	I,M	I,M	I,M	D	D		I,M
FL	D														
GA	x	x	x	x	x	x		D	x		x				
HI						M			M						
ID									x		x		x	x	
IL		x	x	x	x	I,M									
IN					x		x								M,D
IA	x	x	x	x		x									x
KS					x	x							x		
KY	I,M		I,M	I,M											
LA	x	D	I,M	I,M		D		D			D	D			
ME				x											x
MD	I,D	x	x	x	I	I	x	I	I	I	x	I	I	x	I,D
MA	x	x	x	x	x	x	x		x		x			x	
MI	x							D	x	x					
MN	x	x	x	D	D	D	D	D	D	D	D	D	D	D	x
MS	x	x	x	x	x	x			D		D				x
MO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MT	M,D	M,D			M,D		M,D			M		D	M		
NE															
NV	x				x										
NH	x	x	x	x	x								x	x	
NJ											I	M			
NM	x									x					
NY		x	D	x	D			D							
NC	x	x	x	x	x										
ND	x		x	x					x		I,D			x	x
OH		I,M	I,M												
OK						I		I							
OR	x		x	x	x	x	x	x		x		x			
PA	x	x	x	x	x	x	x		x	x	x	x	x	x	x
RI															
SC	x				D	D	D	D				x			
SD						D	M,D			x					
TN		x	x	x					x	x	x				
TX	I	M,D	x	x		I	I					I			
UT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VT		I,M			I,M								x	I,M	I,M
VA	x	x	x	x	x	x	x		x	x	x	x		x	
WA	x	M					I,D						x		
WV	I,M	I,M	I,M	I,M	x	x	x	I				x	x	x	
WI		x	x	x		x	x								
WY	x	x	x	x	x	x	x				x	x	x	x	

I=Industrial Landfills
M=Municipal Landfills
D=Demolition Debris Landfills
x=Industrial, Municipal, and Industrial Landfills

SUBTITLE D LANDFILL REQUIREMENTS

TABLE IV-d

Requirements Enforced Under General Standards and Policies

STATE	NATURAL LINERS	SYNTHETIC LINERS	LOCATION STANDARDS	LEACHATE COLLECTION AND REMOVAL	LEACHATE ANALYSIS	LEACHATE TREATMENT	GROUNDWATER PROTECTION STANDARD	GROUNDWATER MONITORING	CORRECTIVE ACTION FOR GROUNDWATER CONTAMINATION	AIR PROTECTION STANDARD	AIR EMISSIONS MONITORING	METHANE MONITORING	METHANE CONTROLS	CORRECTIVE ACTION FOR OFF-SITE METHANE MIGRATION	SURFACE WATER PROTECTION STANDARDS	SURFACE WATER MONITORING
AL	x	x		x	x	x	M					M	M	x	x	x
AK	I,D	I,D		I,D				x	x		x	x				x
AZ			x					x	M			x	x	x		
AR	x							x							x	x
CA	D	D	D	D	D	D	D	D	D	M,D	M,D					D
CO	x	x		x	x	x	x		x				M,D	x	x	x
CT	x	x		x	x	x				x	x					
DE			I,M				I,M		I,M	I,M	I,M			I,M	I,M	I,M
FL	M	M							D	I		M				
GA	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
HI							M		M						M	M
ID	x								x	x					x	x
IL			x	x	x	x				x	x	x				x
IN	M	M		M	x	x	x	x	x	I,D	x					x
IA	x				x				x	x	x					x
KS	M			I,M	I,M	I,M					I,M					x
KY					I,M				I,M					I,M		I,M
LA	D	D	D			x	x		x	x		I,M				x
ME		I,M			x	D		D			x	x	D	D		
MD	x	x	x	x	x	x	I	I	I,D	I	x	x	I	x	I	I
MA	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x
MI						M			x	x				I,M		x
MN	x	x	D	x	x	x	D	D	D	D	x	D	x	D	D	D
MS	D	x		x	x	x		x	x		x	x	D	D	D	x
MO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MT	M	M		M	M		M		M	M,D					M,D	M,D
NE	I,M	I,M			I,M				I							I,M
NV								x	x		x					x
NH	x	x	x	x	x	x	x			x	x	x	x	x	x	x
NJ	I															M,D
NM										x						
NY	D	D		D	D	D		D		x	x	x	D			D
NC	I,M	I,M	I,M	I,M	I,M	I,M							x	x		
ND	x	x	x	x	x	x			x		x	M		M		
OH	I,M	I		I,M	I,M		I,M		I,M	I,M	I,M	I,M	I,M	I,M		I,M
OK	I,D	I		I								M		I,D		
OR	x	x			x	x				x	x	x		x		x
PA						x	x		x	x	x	x			x	x
RI																
SC	x		x				x	D							x	x
SD							x	x	x							
TN	x	x		x	x						x	x	x	x		
TX	I	I		I	x	x	I		I	I	M,D	I	I	I		x
UT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VT			D	I,M	I,M		I,M								I,M	
VA	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x
WA		M			M	x			x		M			M		
WV	I,M	I	x	I,M	I,M	I	I	x	I			M	M			I,M
WI	x			x	x						x					
WY	x	x	x	x	x	x		x			x	x	x	x		x

I=Industrial Landfills
M=Municipal Landfills
D=Demolition Debris Landfills
x=Industrial, Municipal, and Demolition Debris Landfills

SUBTITLE D LANDFILL REQUIREMENTS

TABLE IV-e

No Enforceable Requirements

STATE	CORRECTIVE ACTION FOR SURFACE WATER CONTAMINATION	RUN-OFF COLLECTION AND REMOVAL	RUN-OFF ANALYSIS	RUN-OFF TREATMENT	RUN-ON CONTROLS	RESTRICTIONS ON RECEIPT OF LIQUID WASTES	RESTRICTIONS ON TYPES OF SUBTITLE D WASTES RECEIVED	DAILY COVER	ENDANGERED SPECIES CRITERIA	DISEASE VECTOR CRITERIA	SAFETY CRITERIA: BIRD HAZARDS	SAFETY CRITERIA: UNCONTROLLED ACCESS	CLOSURE STANDARDS	POST-CLOSURE MONITORING	FINANCIAL RESPONSIBILITY
AL				x											x
AK															
AZ	x	x	x	x	x	I,M	I,M								x
AR															
CA															
CO				x		I,M	I,M		x						x
CT															
DE	D	D	D	D	D				D	D	D			D	D
FL		D	D	D	I,M		D	D	D	D	D	D	D	D	D
GA															x
HI	M	M	M	M	M						M	M		M	M
ID	x		x	x			x								x
IL	x								x						
IN			x	x				D	M					D	I
IA									x						
KS															
KY											I,M				
LA			D	D	D				D		D			D	D
ME															
MD															
MA															
MI			x	x			I,M								
MN															
MS															
MO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MT	I	I	x	x	I	x	I	I	x	I,D	x	I	I,D	x	x
NE	D	x	x	x	D	D	D	D	D	D	D	D	D	D	D
NV			x	x		x			x					x	x
NH															x
NJ															
NM		x	x	x		x	x		x		x	x		x	x
NY															
NC															x
ND															
OH	D	D	D	x	x	D	D	D	D	D	D	D	D	D	x
OK									x						
OR															
PA															
RI			x	x										I,M	I,M
SC		x	x	x					x	x		D	D	x	x
SD	x	x	x	x	x	x			x		x			x	x
TN															
TX															
UT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VT	x	D	x	x	D				x	x	x	D		D	D
VA															x
WA		I,D	x	x	x	x	M	I,D	x	x	x	x		x	x
WV	D	D	D	D				D	I	I	I				x
WI															
WY									x						x

I=Industrial Landfills
M=Municipal Landfills
D=Demolition Debris Landfills
x=Industrial, Municipal, and Demolition Debris Landfills

SUBTITLE D LANDFILL REQUIREMENTS

TABLE IV-f
No Enforceable Requirements

STATE	NATURAL LINERS	SYNTHETIC LINERS	LOCATION STANDARDS	LEACHATE COLLECTION AND REMOVAL	LEACHATE ANALYSIS	LEACHATE TREATMENT	GROUNDWATER PROTECTION STANDARD	GROUNDWATER MONITORING	CORRECTIVE ACTION FOR GROUNDWATER CONTAMINATION	AIR PROTECTION STANDARD	AIR EMISSIONS MONITORING	METHANE MONITORING	METHANE CONTROLS	CORRECTIVE ACTION FOR OFF-SITE METHANE MIGRATION	SURFACE WATER PROTECTION STANDARDS	SURFACE WATER MONITORING
AL									x		x					
AK	M	M		M		x							x	x		
AZ	x	x		x	x	x			I,D		x					x
AR		x		x	x	x	x		x	x	x	x	x	x		
CA																
CO																
CT																
DE	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
FL										M,D	x	I,D	I,D	D	D	D
GA																
HI	M	M	M	M	M	M				M	M	M	M	M		
ID		x			x		x				x	x		x		
IL		x							x					x		
IN	I,D	I,D		I,D												
IA		x										x	x	x		
KS		M														
KY											I,M	I,M				
LA				D	x			D			D	D	D	x		
ME	D	D														
MD																
MA																
MI	D	D		D	x	I,D					x	D	D	D		
MN																
MS																
MO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MT	I,D	I,D	I	I,D	I,D	I,D	x	I,D	I,D	I,D	x	x	x	x	I	I
NE	D	I,D	D	D	D	D	D	D	D	x	x	D	D	D	D	D
NV	x	x		x	x	x						x		x		
NH																
NJ																
NM	x	x		x	x	x	x	x	x		x	x	x	x		x
NY																
NC	D	D	D	D	D	D	D	D	D							
ND												I,D	I,D	I,D		
OH	D	M,D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
OK		D									x					
OR																
PA					I,M											
RI	x	x		x	x	x					x	x				
SC		x		x	x	x			x	x	x	x	x	x		
SD	x	x		x	x	x				M,D	x	x	x	x		x
TN																
TX											I					
UT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VT	x	x		D	D	x	D	D	x	x	x	x	x	x	D	D
VA											x					
WA	x	I,D	x	I,D	I,D			x			I,D	x	I,D	I,D		x
WV	D	M,D		D	D	M,D	M,D	D	M,D	x	x	I,D	I,D	x		D
WI		x														
WY																

I=Industrial Landfills
M=Municipal Landfills
D=Demolition Debris Landfills
x=Industrial, Municipal, and Demolition Debris Landfills

SUBTITLE D LANDFILL RELEASE PREVENTION/MANAGEMENT METHODS

TABLE V

Total Number of Landfills With:

STATE	SYNTHETIC LINERS	NATURAL LINERS	NATURAL RENOVATION (leachate attenuation)	LEACHATE COLLECTION SYSTEMS	LEACHATE TREATMENT	LEACHATE RECIRCULATION	RUN-ON/RUN-OFF CONTROLS	METHANE CONTROLS	RESTRICTIONS ON RECEIPT OF LIQUID WASTES
AL							40	2	124
AK	7	4	4	4			82		56
AZ	1			1				1	
AR		116		4	4		116		116
CA	17	50	50	70	32	67	495	60	380
CO	1	20	3	3	1	1	49		44
CT			184	3	1		184	71	189
DE	3	8	26	12	9	2	6	3	34
FL	14	33	117	14	10	3	84	12	5
GA	1	5	385	5			348	4	390
HI		1		1		1	1		24
ID		3	121	3	1		21	1	33
IL		235					210	190	50
IN		131	94	16	2	14	25	5	10
IA	1	93	93	8	2	6	93	25	93
KS		244	244	2		3	6	2	
KY	3	104		87	2	75	150	4	181
LA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ME	2	19	69	22	9	2	75	12	362
MD	3	6	66	9	10		72		76
MA	2	20		33	27	6	8	22	
MI	11	24	10	45	3	20	120	20	257
MN		4	160	3	2		160	2	160
MS			130						125
MO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MT		15					80		140
NE		3	413	1	1		45	3	88
NV							25		5
NH		2	123	2		2	125	20	125
NJ	5	6		11	11		36	41	107
NM	1		221				188		3
NY	8	15		23	22	1	55	55	55
NC	1			1	1			1	162
ND	1	18					139		139
OH		5					211	13	211
OK		35		1			173	15	173
OR	1	11	220	10	8	1	220	3	220
PA	21	55	111	69	44	12	204	17	204
RI				1			13		2
SC							214		214
SD	0	0	0	0	0	0	0	0	0
TN		166	166	2	4	1	166		166
TX	4	187	852	6		6	1,044	1,044	1,044
UT	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VT	2		100	2	2		100	5	100
VA	3	94	26	23	16	7	240	10	264
WA	1			2				2	
WV		24	2	35	35	2	133	1	106
WI	1	27	921	58	58		144	79	4
WY	2	8	120				245	1	238

SUBTITLE D LANDFILL VIOLATIONS

TABLE VI

STATE	GROUNDWATER CONTAMINATION	GROUNDWATER MONITORING PROGRAM DEFICIENCIES	SURFACE WATER CONTAMINATION	AIR CONTAMINATION	METHANE CONTROL DEFICIENCIES	OPERATIONAL DEFICIENCIES	OTHER
AL	20	10	30	10	10	124	
AK	4	3	3	2	unk	76	1
AZ	5			22	2	36	10
AR	4	3	21			86	
CA	7	17	79	44	17	188	85
CO	13	3	2			11	
CT	12	74	6	4	2	120	
DE	6		3			28	
FL	44	25	10	1	9	92	9
GA	2	1	6	11	3	226	
HI				21		136	
ID	3	3	1	7		58	
IL		N/A		N/A		N/A	
IN	2	6	43	5	5	131	
IA	N/A	N/A	N/A	N/A	N/A	N/A	N/A
KS						137	
KY	N/A	N/A	N/A	N/A	N/A	N/A	N/A
LA	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ME	77	31	104	90	1	276	
MD	1		2			76	
MA	16	120	N/A	2		92	
MI	42	61	N/A	N/A	N/A	145	
MN	83	20		2		160	
MS						102	
MO	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MT				12		62	22
NE	1	3			2	35	
NV			1	10		30	
NH	26	26	22	73	6	125	
NJ	30	N/A	N/A	N/A	25	108	
NM	4	N/A	26	54		100	41
NY	22	293	105	35	6	181	
NC		1	9		1	45	3
ND						106	
OH	12	N/A	13	N/A	8	211	7
OK	7	6	60			158	
OR	4		11	24		58	
PA	36	31	8	3	15	46	
RI	4	4				3	
SC	76	48				129	
SD	2	10	1	5		60	
TN	3	20	6		2	50	
TX	18	9	62	108		679	63
UT	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VT						96	
VA	11	41	38	23	1	205	
WA	69		37	41	3	57	
WV	8		4	33	1	56	
WI	38	10	5	252	4	690	
WY	1	6				36	

unk = unknown

STATE RECYCLING PROGRAMS

TABLE VII-a

STATE	Funding		LITTER CONTROL BILL	BOTTLE BILL	LOCAL PROGRAMS	LOCAL MANDATORY RECYCLING	STATEWIDE MANDATORY RECYCLING	USED OIL RECYCLING CONTACT	USED TIRE RECYCLING PROGRAM
	STATE GRANT	OTHER							
AL								x	
AK					x				
AZ									
AR			x						
CA	x	x	x		x				
CO			x		x				
CT	x		x	x	x	x			
DE				x				x	
FL									
GA		x							
HI								x	
ID									
IL	x	x	x						
IN								x	
IA		x	x	x					
KS									
KY	x		x					x	
LA	x							x	
ME	x			x	x	x		x	
MD						x		x	
MA	x	x	x	x	x	x		x	
MI	x	x	x	x	x			x	
MN	x	x	x		x	x		x	x
MS									
MO								x	
MT		x							
NE	x	x	x		x			x	
NV								x	
NH	x	x	x			x			
NJ	x	x	x		x	x		x	
NM								x	
NY	x			x	x	x		x	
NC	x							x	
ND					x				
OH	x	x	x						
OK									
OR			x	x	x			x	
PA	x		x		x	x		x	
RI	x	x	x				x	x	
SC	x							x	
SD									
TN			x						
TX					x			x	x
UT								x	
VT				x				x	
VA	x	x	x					x	
WA	x	x	x		x			x	x
WV								x	
WI	x		x		x	x		x	
WY									

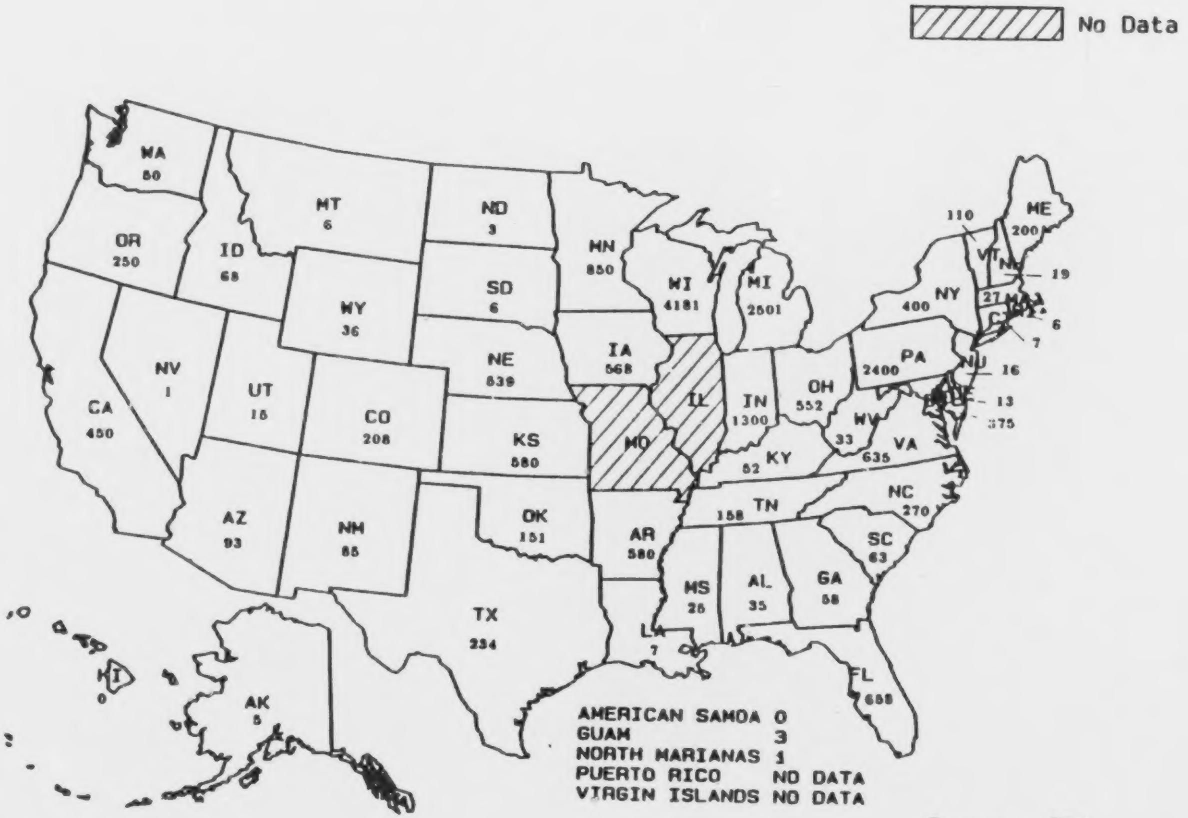
STATE RECYCLING MARKETS DEVELOPMENT

TABLE VII-b

STATE	CONSUMER EDUCATION	RESEARCH IN RECYCLED MATERIALS USE	FINANCES RESEARCH	STATE PROCUREMENT	FINANCIAL/TECHNICAL ASSISTANCE	TAX CREDITS (sales &/or equipment)
AL						
AK		x			x	
AZ						
AR						x
CA	x	x	x	x	x	
CO						
CT					x	
DE						
FL		x		x		x
GA						
HI					x	
ID						
IL			x	x	x	x
IN						x
IA						
KS						
KY						x
LA						
ME						
MD	x			x		
MA					x	
MI		x		x		
MN	x			x	x	
MS						
MO				x		
MT						
NE					x	
NV					x	
NH	x					
NJ	x		x		x	x
NM						
NY				x		
NC						x
ND						
OH		x		x		
OK	x					
OR				x		x
PA	x					
RI				x		
SC						x
SD						
TN						
TX						
UT						
VT				x		
VA						x
WA				x		
WV	x					
WI						x
WY						

Figure 6.2

NUMBER OF LAND APPLICATION UNITS BY STATE/TERRITORY


▨ No Data
WA 50
OR 250
CA 450
ID 68
NV 1
MT 6
WY 36
UT 15
CO 208
AZ 93
NM 85
ND 3
SD 6
NE 839
KS 580
OK 151
TX 234
MN 850
IA 568
MO
AR 580
LA 7
WI 4181
IL
MI 2501
IN 1300
OH 552
KY 52
TN 158
MS 26
AL 35
GA 58
FL 688
SC 63
NC 270
VA 635
WV 33
PA 2400
NY 400
VT 110
NH 19
ME 200
MA 27
RI 6
CT 7
NJ 16
DE 13
MD 375
AK 5
HI 0
AMERICAN SAMOA 0
GUAM 3
NORTH MARIANAS 1
PUERTO RICO NO DATA
VIRGIN ISLANDS NO DATA

Source: EPA

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"Used Oil: State Agencies Which Regulate Used Oil and Recycling Contacts," State of Florida Department of Environmental Regulation: May, 1985.

NATIONAL ORGANIZATIONS/PUBLICATIONS ON SOLID WASTE AND RECYCLING

Association of State & Territorial
Waste Management Officials
444 N. Capitol St., NW
Washington, D.C. 20001
Kerry Callahan
(202) 624-5828

Council of State Governments
270 Broadway, rm 513
New York, NY 10007
Shelly Dresser
(212) 693-0400

Office of Solid Waste
WH 565, rm 2817
U.S. EPA
401 M St., SW
Washington, D.C. 20460
Eric Males (recycling)
(202) 382-7922

Inform, Inc.
381 Park Ave.
New York, NY 10016
Allen Hershkowitz
(212) 689-4040

National Recycling Coalition, Inc.
5800 Ogden Court
Bethesda, MD 20816-1263
E. Gifford Stack
(301) 320-3535

Biocycle Magazine
Box 351
Emmaus, PA 18049
Jerry Goldstein
(215) 967-4135

Environmental Action Foundation
National Clearinghouse for Deposit
Legislation
1525 New Hampshire Ave., NW
Washington, D.C. 20036
Hawley Truax
(202) 745-4871

Environmental Task Force
1012 14th St., NW, 15th floor
Washington, D.C. 20005
Ruth Lampi (recycling)
Rick Parish (solid waste)
(202) 842-2222

Institute for Local Self-Reliance
2425 18th St., NW
Washington, D.C. 20009
Neil Seldman
(202) 232-4108

Resource Recycling Magazine
PO Box 10540
Portland, OR 97210
Jerry Powell
(503) 227-1319

For a recent state recycling agency directory, a state oil recycling directory, and/or a list of Recycling Centers in the metro Washington, D.C. area write or call Fund for Renewable Energy and the Environment, 1001 Connecticut Ave., NW, suite 638, Washington, D.C., 20036, (202) 466-6880.

R4950.1.5F 6/87

THE STATE OF THE STATES 1987

HAZARDOUS WASTE

4

APPENDIX

FUND FOR RENEWABLE ENERGY & THE ENVIRONMENT

Prepared by:

The Fund for Renewable Energy and the Environment
1001 Connecticut Avenue
Suite 638
Washington, D.C. 20036
(202) 466-6880

Introduction

The purpose of the Hazardous Waste Appendix, one of six appendices designed to supplement the data in the 1987 *State of the States* report, is to provide current data on the status of the fifty state hazardous waste management programs. It provides a national picture of hazardous waste management efforts through maps and detailed information, and it allows comparisons of the problems states face and their legislative and program responses.

Information from the main report--state rankings, primary map, brief text, and primary matrix--are presented in the forward section of the packet. Additional matrix information and maps, as well as hazardous waste management contacts are also included. In some cases, data not considered in the ranking of state programs, such as disposal volumes of low-level radwaste and varying estimates of state hazardous waste generation, has been included as additional information for the reader.

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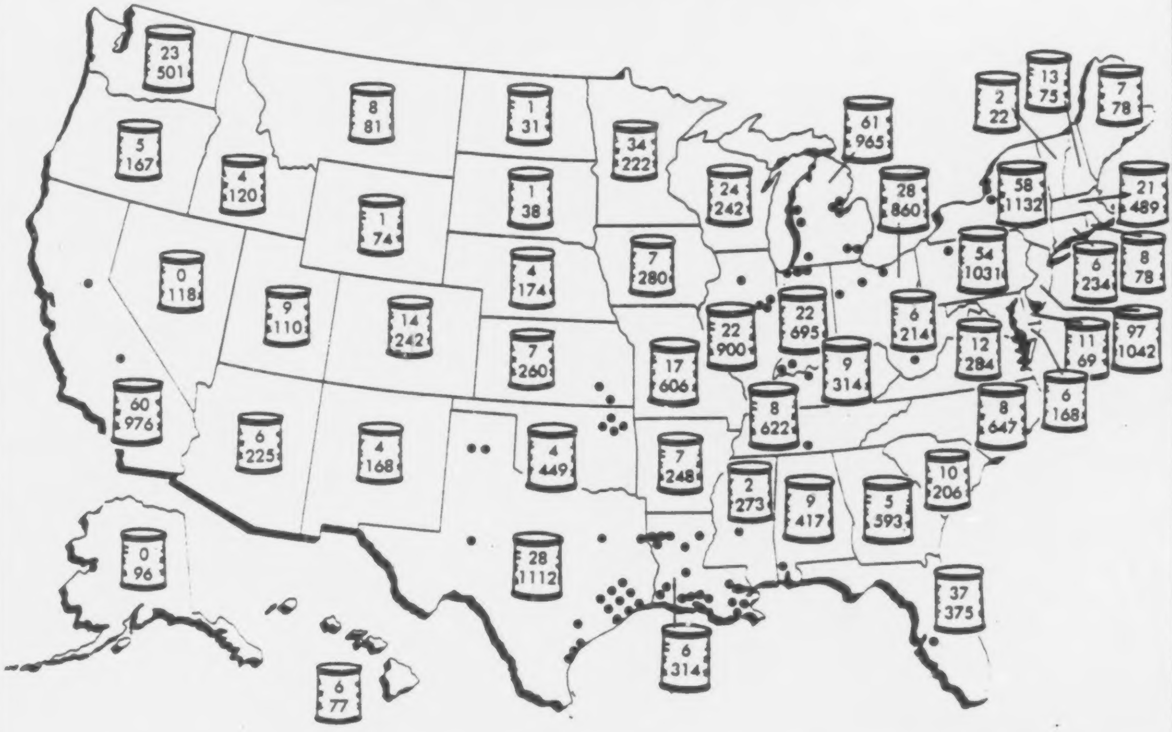
STATE ABBREVIATIONS

AL	ALABAMA
AK	ALASKA
AZ	ARIZONA
AR	ARKANSAS
CA	CALIFORNIA
CO	COLORADO
CT	CONNECTICUT
DE	DELAWARE
FL	FLORIDA
GA	GEORGIA
HI	HAWAII
ID	IDAHO
IL	ILLINOIS
IN	INDIANA
IA	IOWA
KS	KANSAS
KY	KENTUCKY
LA	LOUISIANA
ME	MAINE
MA	MASSACHUSETTS
MI	MICHIGAN
MN	MINNESOTA
MS	MISSISSIPPI
MO	MISSOURI
MT	MONTANA
NE	NEBRASKA
NV	NEVADA
NH	NEW HAMPSHIRE
NJ	NEW JERSEY
NM	NEW MEXICO
NY	NEW YORK
NC	NORTH CAROLINA
ND	NORTH DAKOTA
OH	OHIO
OK	OKLAHOMA
OR	OREGON
PA	PENNSYLVANIA
RI	RHODE ISLAND
SC	SOUTH CAROLINA
SD	SOUTH DAKOTA
TN	TENNESSEE
TX	TEXAS
UT	UTAH
VT	VERMONT
VA	VIRGINIA
WA	WASHINGTON
WV	WEST VIRGINIA
WI	WISCONSIN
WY	WYOMING

STATE PROGRAM RANKINGS: HOW STATES MEASURE UP

	AIR PROGRAMS	SOIL CONSERVATION PROGRAMS	GROUNDWATER PROGRAMS	HAZARDOUS WASTE PROGRAMS	SOLID WASTE PROGRAMS	RENEWABLE ENERGY & ENERGY CONSERVATION	TOTAL	RANK
AL	3	3	2	3	3	2	16	26
AK	7	3	3	2	2	1	18	25
AZ	7	3	7	5	2	3	27	19
AR	1	3	2	5	3	4	18	25
CA	10	3	7	9	9	10	48	2
CO	4	6	4	3	4	3	24	21
CT	9	6	9	4	9	7	44	4
DE	1	8	6	3	4	2	24	21
FL	7	4	9	8	6	7	41	7
GA	4	5	7	4	3	3	26	20
HI	4	4	3	2	2	4	19	24
ID	2	1	6	1	2	6	18	25
IL	7	9	5	7	7	6	41	7
IN	6	5	4	6	7	8	36	10
IA	5	10	5	5	7	7	39	8
KS	2	5	8	8	4	2	29	17
KY	7	3	1	6	8	3	28	18
LA	5	3	3	7	2	1	21	23
ME	3	6	7	6	6	8	36	10
MD	3	8	7	6	6	4	34	12
MA	6	4	8	9	6	8	41	7
MI	8	7	8	9	8	3	43	5
MN	5	6	5	9	9	4	38	9
MS	1	3	2	4	2	2	14	28
MO	5	6	7	8	1	4	31	15
MT	2	5	6	3	1	6	23	22
NE	4	6	6	2	6	7	31	15
NV	2	6	4	2	2	7	23	22
NH	6	5	5	7	5	4	32	14
NJ	9	6	7	10	10	5	47	3
NM	1	2	8	5	1	6	23	22
NY	5	5	10	8	8	7	43	5
NC	8	7	8	6	6	7	42	6
ND	1	3	4	2	3	3	16	26
OH	8	8	4	5	5	4	34	12
OK	5	5	5	4	7	3	29	17
OR	6	2	7	5	7	8	35	11
PA	8	6	5	5	3	5	32	14
RI	6	4	6	4	7	3	30	16
SC	6	5	7	5	2	6	31	15
SD	1	8	6	2	2	4	23	22
TN	3	3	4	7	5	7	29	17
TX	7	2	2	5	3	7	26	20
UT	3	4	3	2	1	3	16	26
VT	3	3	5	6	4	7	28	18
VA	8	7	6	2	3	7	33	13
WA	8	1	6	5	5	3	29	17
WV	2	5	2	4	1	1	15	27
WI	9	8	8	7	8	9	49	1
WY	1	3	8	1	2	1	16	26

SUPERFUND AND OTHER HAZARDOUS WASTE SITES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242
4
174
7
260
60
976
6
225
4
168
4
449
28
1112
0
96
6
77
24
242
7
280
22
900
17
606
61
965
28
860
22
695
9
314
6
214
8
622
7
248
6
314
2
273
9
417
5
593
10
206
37
375
8
647
12
284
6
168
11
69
97
1042
54
1031
58
1132
6
234
8
78
21
489
2
22
13
75
7
78

888 — Total National Priority List Sites (includes proposed sites)

18,714 — Total Emergency Response and Remedial Information System sites

⁘ **Hazardous waste injection facilities**

Note: These locations and figures do not include military hazardous waste sites. In 1984 Defense Department agencies produced more than 530,000 tons of hazardous waste at 333 installations.

SOURCE: EPA and National Campaign against Toxic Hazards

HAZARDOUS WASTE--THE BIG PICTURE

The chemical and manufacturing industries generate about 260 million tons of hazardous waste each year in the United States--one ton for every man, woman, and child. Generation of growing amounts of hazardous waste largely coincides with the expansion of the chemical industry between 1945 and 1970 when the production of synthetic organic chemicals increased tenfold. Until a decade ago the primary solution for disposal was to bury 50 gallon drums of waste in landfills, or to dump it into pits, lagoons, or wells. As public awareness of the danger of toxic chemicals spread, new laws were passed by Congress to control their use and disposal.

The Resource Conservation and Recovery Act (RCRA) was passed in 1976 to address growing problems with disposal of both solid and hazardous waste. The Toxic Substances Control Act (TSCA) was also passed at this time to regulate toxic chemicals throughout their manufacture, use and disposal cycles. Monitoring and research under these laws helped to reveal the extent of hazardous waste contamination the nation faced.

Once the magnitude and severity of the hazardous waste disposal problem was revealed, Congress passed the Comprehensive Environmental Response, Compensation and Liability Act--Superfund, a five-year, $1.6 billion project, which outlined a plan of action for the cleanup of the nation's worst hazardous waste sites.

State governments were given an important role in Superfund cleanups. In many cases EPA set up cooperative arrangements with states. Superfund would provide money and a state agency would oversee cleanup work. In other cases EPA took the lead and the state maintained an advisory role.

From 1981 to 1986, only 13 sites were removed from the national priority list and remedial action was undertaken at 500 sites. For 90 percent of the sites on the list, no long term action was begun in the first five years of the program. There was clearly not enough money or commitment.

The states will get a boost in support from the $8.5 billion dollar Superfund reauthorized in September 1986. The new five-year program will provide long-term funding, standardized guidelines for "cleaned-up" sites, and community right-to-know provisions. But much work remains to be done. Only twenty-nine states have passed cleanup measures to supplement federal superfund activity.

But while Superfund has riveted the country's attention on hazardous waste cleanup, state governments are motivated by a much broader agenda for the management of hazardous waste. The primary solution being urged is reduction of hazardous waste production through use of substitute chemicals, neutralization of hazardous chemicals on site, or recycling of waste. Greater use of recycling and neutralization of wastes will require incentives for industry. Another element that may force the issue is community right-to-know laws which allow citizens access to information on the hazardous materials used or stored in their community. In any case, a difficult and costly period of transition for state government and industry lies ahead with great gains needing to be made in waste minimization and cleanup technology.

HAZARDOUS WASTE SNAPSHOT

New Jersey represents the best working model for hazardous waste management. An essential part of a state's policies are those which address hazardous waste reduction, and New Jersey has made source reduction and recycling a top priority while considering land disposal only as a last resort. The state also actively conducts one of the best-funded state superfund programs and has recently approved a $200 million dollar bond issue for hazardous waste cleanup. The New Jersey Environmental Cleanup Responsibility Act (ECRA) of 1983, which places responsibility for cleanup on industry before sale of a property to a new owner, represents New Jersey's innovative approach to settling difficult questions such as cleanup liability.

RANKING NOTES

States were ranked on a scale of one to ten on the strength of their environmental policies. The rank is not meant to judge particular environmental conditions in each state, but considers environmental problems as a need for program strength. Key factors weighed against this need are twofold: legislative and program initiatives to develop cleanup, collection or disposal strategies over and above federal requirements, and the reduction and recycling of hazardous waste.

State superfund programs were heavily considered in the determination of state rankings. State superfunds are defined by the existence of a state statute or statutes that authorize a state to assess hazardous waste sites and to initiate remedial cleanup actions, and/or empower it to enforce action by responsible parties. Nevertheless, despite the existence of superfund statutes, if a state did not fund or direct a program separate from the federal Superfund program, that state was not considered as having a state superfund. This is the case for Colorado, Georgia, and Montana.

Five other state program initiatives were assessed: household hazardous waste collection programs; restrictions on underground injection of hazardous waste; the stringency of regulations governing the management of small quantities of hazardous waste; government incentives, whether financial, legal or other, to encourage the reduction and recycling of hazardous waste; and community right-to-know provisions.

The broad indicators of the severity of the hazardous waste problem within each state were the number of National Priority List (NPL) sites, and the number of Emergency Response and Remedial Investigation System (ERRIS) sites. This sense of crisis or control then served as a parameter within which individual state policies were considered.

Summary of Hazardous Waste Management Activity:

- twenty-nine states provide incentives to reduce or recycle hazardous wastes;
- household hazardous waste collection programs have taken place in seventeen states on a county, state or local level;
- restrictions on underground injection of hazardous waste has been passed in ten states;
- thirteen states have regulations for small quantity generators more stringent than the federal Hazardous and Solid Waste Amendments (HSWA) of 1984 that took effect September 22, 1986;
- thirty-nine states had received final EPA approval for the pre-HSWA program as of May 15, 1986;
- twenty-nine states have superfund statutes--which at a minimum authorize the state to conduct a site assessment or force a responsible party to conduct an assessment.

HAZARDOUS WASTE MATRIX

	STATE SUPERFUND STATUTES	SMALL QUANTITY GENERATOR REGULATIONS	UNDERGROUND INJECTION RESTRICTIONS	PRE-HSWA FINAL AUTHORIZATION	COMMUNITY RIGHT TO KNOW	INCENTIVES TO REDUCE/RECYCLE	HOUSEHOLD HAZARDOUS WASTE COLLECTION	NUMBER OF NATIONAL PRIORITY LIST (NPL) SITES	NUMBER OF ERRIS LIST SITES	RANKING BY HAZARDOUS WASTE GENERATION
AL			•			•		10	475	23
AK					•		S	0	108	46
AZ	•		•	•				9	251	39
AR	•			•				8	277	31
CA	•	•	•		•	•	C/L	61	1,622	4
CO				•				15	323	32
CT			•			•	S	7	294	21
DE				•	•			14	136	29
FL	•		•	•		•	S	39	801	17
GA				•		•		5	675	20
HI						•		6	85	48
ID								4	140	36
IL	•			•		•		25	1,068	3
IN	•			•		•		28	865	10
IA	•				•	•		13	337	27
KS	•	•	•	•		•		7	284	28
KY	•			•		•		10	383	22
LA	•	•	•	•	•			7	343	14
ME	•	•				•		21	96	37
MD	•	•		•	•	•		8	233	24
MA	•	•	•	•	•	•	C/L	7	628	16
MI	•	•			•	•	S	66	1,447	8
MN	•	•		•		•	S	38	304	25
MS				•		•		2	298	30
MO	•			•	•	•		17	867	13
MT				•	•			9	130	43
NE				•				5	204	38
NV				•				0	122	45
NH	•	•		•	•	•	S	13	119	40
NJ	•			•	•	•		97	1,238	1
NM	•			•			C/L	4	187	42
NY	•			•		•	C/L	65	1,242	7
NC				•	•	•		8	706	11
ND				•				1	36	49
OH	•					•	S	30	927	2
OK			•	•		•		5	503	33
OR	•			•	•	•	C/L	5	197	34
PA	•			•	•	•		65	1,908	5
RI		•		•	•	•	S	8	184	35
SC	•			•		•		12	310	15
SD				•				1	44	50
TN	•		•	•	•	•		8	689	9
TX	•			•	•			26	1,879	6
UT				•				10	149	41
VT	•	•		•	•		S	2	60	44
VA				•			C/L	13	376	12
WA	•			•	•		C/L	28	542	26
WV		•		•	•	•		6	278	19
WI	•	•		•		•	S	30	318	18
WY								1	87	51

FOOTNOTES TO THE HAZARDOUS WASTE MATRIX

[1] Statutes authorizing a state to assess hazardous waste sites and to initiate remedial clean-up actions, and/or to enforce assessment by responsible parties when deemed necessary. States which have this authority and do not actively exercise it, are not included on the matrix. (source: phone conversations with individual state officials).

[2] Small quantity generator regulations that are more stringent than the federal standards that took effect on September 22, 1986. (source: phone conversations with regional EPAs).

[3] Includes states which fulfilled requirements of the 1976 Resource Conservation and Recovery Act (RCRA) set forth prior to the Hazardous and Solid Waste (HSWA) amendments of 1984. (source: US EPA, "States Granted Final Authorization for Pre-HSWA Program as of May 15, 1986, Office of Solid Waste, Washington, DC,1986).

[4] Right To Know laws usually address hazardous materials, not hazardous waste, but serve nevertheless as a measure of a state's responsiveness to the role and rights of local communities. (source: "Hazardous Waste News," Thompson Publishing Group, Washington, DC, May 1986, Vol. III, pp. 3-6).

[5] Incentives to reduce/recycle hazardous wastes are classified as financial, institutional, and other. (source: Hazardous Waste Management: A Survey of State Legislation, 1982, prepared by National Conference of State Legislatures, Denver, CO, 1982).

[6] S signifies Statewide
C/L signifies County or Local level
These programs may be ongoing, annual or one-time events.
(source: "Overview of Nationwide Small Quantity Generator and Household Hazardous Waste Collection Programs," prepared by Linda Dunphy, Environmental Task Force, Washington, DC, March 1986).

[7] Emergency Response and Remedial Information System (ERRIS). (source:National Campaign Against Toxic Hazards, Washington, DC, 1986).

[8] Source: 1979 EPA contractor study, noted in The Toxic Substances Dilemma, National Wildlife Federation, Washington, D.C., 1980, p.79.

HAZARDOUS WASTE SITES ON THE NATIONAL PRIORITY LIST (NPL)

TABLE I

					Completed Projects as of 6/30/86*			
STATE	TOTAL NPL SITES proposed and final	SITES WITH OBSERVED GROUNDWATER CONTAMINATION	SITES WITH OBSERVED SURFACE WATER CONTAMINATION	SITES WITH OBSERVED AIR CONTAMINATION	REMEDIAL INVESTIGATION/ FEASIBILITY STUDY	REMEDIAL DESIGN	REMEDIAL ACTION	SITES DELETED: NO FURTHER ACTION NEEDED**
AL	10	8	5	0	0	0	0	0
AK	0	0	0	0	0	0	0	0
AZ	9	6	2	1	1	1	1	0
AR	8	3	6	3	1	0	0	0
CA	61	51	12	5	8	4	1	0
CO	15	13	12	3	2	0	0	0
CT	7	6	5	1	1	0	0	0
DE	14	11	8	2	2	0	0	0
FL	39	34	18	0	7	0	0	0
GA	5	4	2	0	0	0	1	1
HI	6	6	0	0	0	0	0	0
ID	4	3	1	1	0	0	0	0
IL	25	19	12	5	7	1	0	0
IN	28	15	12	1	2	1	0	0
IA	13	8	2	1	2	1	0	0
KS	7	5	4	1	0	0	0	0
KY	10	4	3	3	1	0	0	0
LA	7	3	5	4	2	1	0	0
ME	21	4	4	1	3	1	1	0
MD	8	6	4	2	2	0	0	1
MA	7	15	16	8	6	2	1	0
MI	66	54	21	5	10	2	2	1
MN	38	31	14	1	9	0	0	1
MS	2	0	1	0	0	0	0	1
MO	17	11	6	4	2	2	0	0
MT	9	7	8	2	1	1	1	0
NE	5	5	0	0	0	0	0	0
NV	0	0	0	0	0	0	0	0
NH	13	13	10	3	3	2	2	0
NJ	97	72	37	22	19	7	3	1
NM	4	4	1	1	1	0	0	0
NY	65	40	21	9	7	6	2	0
NC	8	6	2	0	0	0	1	1
ND	1	1	0	0	1	0	0	0
OH	30	21	18	2	4	0	0	1
OK	5	4	4	1	1	1	0	0
OR	5	3	4	2	0	0	0	0
PA	65	51	41	17	17	6	4	2
RI	8	8	4	0	2	0	0	0
SC	12	10	3	1	0	0	0	0
SD	1	1	1	0	0	0	0	0
TN	8	5	6	0	1	0	0	0
TX	26	17	13	9	5	3	0	0
UT	10	5	4	2	0	0	0	0
VT	2	2	2	0	0	0	0	0
VA	13	12	7	3	1	1	1	0
WA	28	16	13	4	7	0	0	0
WV	6	3	5	1	1	0	0	0
WI	30	20	7	0	2	0	0	0
WY	1	1	1	0	0	0	0	0

* For an explanation of these terms turn to the glossary at the end of of this appendix

** The total of 13 sites deleted include three sites located in the territories of the United States

INCENTIVES TO REDUCE AND RECYCLE HAZARDOUS WASTE

TABLE II

STATE	FINANCIAL INCENTIVES	LEGAL INCENTIVES	INSTITUTIONAL INCENTIVES
AL	fees		SO
AK			
AZ			
CA	fees	X 2	R&D;SO
CO			
CT		X 1	
DE			
FL	fees;bonds	X 2	SO
GA	bonds		IN;SO
HI	fees		
ID			
IL	fees;bonds;grants	X 2	WE;R&D
IN	fees	X 1	WE
IA	fees	X 1	SO
KS	fees	X 1	
KY	fees		
LA			
ME	fees		
MD			SO
MA		X 2	TA;WE;R&D;SO
MI	tax credit;fees	X 2	
MN	bonds;tax credit	X 1	TA;SO
MS	bonds	X 1;X 2	SO
MO	fees		WE
MT			
NE			
NV			
NH	fees		
NJ		X 1	other
NM			
NY	fees;bonds;tax credit	X 2	TA;WE;R&D;SO
NC	fees;bonds;tax credit		WE
ND			
OH		X 2	
OK	fees		WE
OR	fees;tax credit		
PA			IN;MA
RI		X 1	
SC	fees	X 1	
SD			
TN	fees;tax credit		
TX			
UT			
VT			
VA			
WA			
WV			WE
WI	fees;tax credit		WE
WY			

- Fees include waste-end taxes, licenses, permits, inspection fees, disposal taxes
- Tax incentives include property and equipment tax exemptions, corporate income tax exemptions, sales, use, and/or excise tax exemptions
- x1 includes the exclusion of recycled or treated wastes from regulations, the exclusion of certain facilities from permit requirements, and/or streamlined permitting
- x2 indicates restrictions on land burial
- WE=waste exchanges; TA=technical assistance; IN=information network; MA=management assistance; R&D=research and development; SO=state ownership of alternative technology facilities

UNDERGROUND INJECTION (U.I.) OF HAZARDOUS WASTE

TABLE III

				Operating Status of Class I+ Hazardous Waste Wells at Facilities in the U.S. (August 1984)				
STATE	U.I. CONTROL PRIMACY	U.I. AS MAJOR SOURCE OF GROUNDWATER CONTAMINATION	TOTAL ACTIVE FACILITIES	TOTAL ACTIVE WELLS	TOTAL ABANDONED WELLS	TOTAL OTHER WELLS	TOTAL WELLS	TOTAL * FACILITIES
AL	x	x	1	2	1	0	3	1
AK			1	1	0	1	2	1
AZ			0	0	0	0	0	0
AR	x		3	4	1	0	5	3
CA			2	2	0	0	4	3
CO			0	0	0	2	1	1
CT	x		0	0	0	0	0	0
DE	x		0	0	0	0	0	0
FL	x	x	2	4	0	0	4	2
GA	x	x	0	0	0	0	0	0
HI		x	0	0	0	0	0	0
ID	x	x	0	0	0	0	0	0
IL	x	x	4	6	0	0	6	4
IN		x	6	8	5	0	13	10
IA		x	0	0	0	0	0	0
KS	x		1	5	2	0	7	2
KY		x	1	2	0	0	2	1
LA	x	x	2	60	5	6	71	28
ME	x		0	0	0	0	0	0
MD	x	x	0	0	0	0	0	0
MA	x		0	0	0	0	0	0
MI			7	11	11	0	22	10
MN		x	1	0	0	0	0	0
MS	x		0	1	0	0	1	1
MO	x	x	0	0	0	0	0	0
MT		x	0	0	0	0	0	0
NE	x		0	0	0	0	0	0
NV			0	0	0	0	0	0
NH	x		0	0	0	0	0	0
NJ	x	x	0	0	0	0	0	0
NM	x		0	0	0	0	0	0
NY			0	0	0	0	0	0
NC	x		0	0	4	0	4	1
ND	x	x	0	0	0	0	0	0
OH	x		5	14	1	0	15	5
OK	x		5	6	1	1	8	6
OR	x	x	0	0	0	0	0	0
PA		x	0	0	3	0	3	1
RI	x		0	0	0	0	0	0
SC	x		0	0	0	0	0	0
SD	x		0	0	0	0	0	0
TN		x	0	0	0	0	0	0
TX	x		29	69	7	5	79	31
UT	x		0	0	0	0	0	0
VT	x		0	0	0	0	0	0
VA			0	0	0	0	0	0
WA	x	x	0	0	0	0	0	0
WV	x		0	0	0	0	0	0
WI	x		0	0	0	0	0	0
WY	x		0	0	0	1	1	1

+ Class I wells inject hazardous waste below the lower most underground sources of drinking water as defined in 40 CFR 144.3

++ Underground injection control primacy means the state has authority to regulate the underground injection of certain or all classes of hazardous waste

* Total includes inactive and active facilities

CONTRAST BETWEEN TWO STUDIES SHOWING ESTIMATED HAZARDOUS WASTE VOLUME GENERATED BY STATE IN MMTs*

TABLE IV

STATE	1981 OFFICE OF TECHNOLOGY ASSESSMENT	1983 CONGRESSIONAL BUDGET OFFICE
AL	265,680	6,547,000
AK	360	52,000
AZ	4,280,000	642,000
AR	N/A	3,729,000
CA	15,000,000	17,284,000
CO	775,490	1,902,000
CT	102,000	4,238,000
DE	272,000	894,000
FL	N/A	2,981,000
GA	38,500,800	3,338,000
HI	N/A	202,000
ID	N/A	1,160,000
IL	1,810,000	14,810,000
IN	94,900,000	10,189,000
IA	N/A	1,774,000
KS	45,300	2,564,000
KY	415,000	4,647,000
LA	38,800,000	13,801,000
ME	5,290	337,000
MD	272,100	2,989,000
MA	172,000	4,536,000
MI	408,000	12,399,000
MN	181,000	2,212,000
MO	658,930	6,046,000
MS	1,810,000	1,816,000
MT	91,200	662,000
NE	1,250,000	739,000
NV	N/A	379,000
NH	9,980	431,000
NJ	855,000	12,948,000
NM	N/A	619,000
NY	1,270,000	9,876,000
NC	N/A	3,954,000
ND	125,000	269,000
OH	3,260,000	19,692,000
OK	3,570,000	2,673,000
OR	19,100	969,000
PA	3,628,000	18,260,000
RI	1,600	1,745,000
SC	1,587,000	3,669,000
SD	1,590	159,000
TN	4,300,000	12,159,000
TX	29,146,960	34,866,000
UT	558,000	1,139,000
VT	9,070	226,000
VA	181,000	4,038,000
WA	616,000	5,523,000
WV	N/A	5,642,000
WI	81,600	3,297,000
WY	N/A	572,000
TOTALS:	255-275,000,000**	265,595,000

* Million Metric Tons

** Includes estimates of 5 to 25 MMTs for those states with data not available

Source: United States General Accounting Office

NATIONAL LOW-LEVEL RADWASTE DISPOSAL VOLUMES

TABLE V

CUBIC FEET/OCTOBER 1986 AND YEAR TO DATE

STATE	OCTOBER	YEAR TO DATE	RANKING YEAR TO DATE
AL	6,337	44,827	12
AK	0	0	44*
AZ	1,456	3,697	31
AR	0	4,474	29
CA	13,130	82,503	6
CO	0	1,073	37
CT	5,439	47,994	11
DE	117	934	38
FL	6,659	30,276	18
GA	5,539	41,394	14
HI	0	2,029	35
ID	0	0	44*
IL	20,979	179,886	1
IN	0	0	44*
IA	372	7,533	27
KS	0	1,912	36
KY	691	2,835	32
LA	2,060	17,162	21
ME	1,000	5,964	28
MD	45	9,746	25
MA	5,232	55,230	10
MI	2,665	33,780	17
MN	3,028	23,058	19
MS	1,981	12,558	23
MO	0	9,168	26
MT	30	591	39
NE	1,493	17,865	20
NV	0	0	44*
NH	1,858	2,619	34
NJ	5,476	33,917	16
NM	0	0	44*
NY	7,504	97,004	4
NC	6,418	66,191	7
ND	0	0	44*
OH	1,070	14,400	22
OK	2,775	40,695	15
OR	18,377	92,254	5
PA	17,287	160,689	2
RI	36	192	41
SC	14,080	99,307	3
SD	8	8	43
TN	7,690	55,466	9
TX	0	425	40
UT	0	2,745	33
VT	0	10,308	24
VA	5,061	60,325	8
WA	3,814	43,804	13
WV	0	0	44*
WI	158	4,221	30
WY	0	0	43*

* Ranked with 8 other states and entities having no shipments so far this year.

Source: Chem-Nuclear Systems, Inc., and U.S. Ecology, Inc. as cited by SWUCO in Radwaste Report, Dec. 15, 1986.

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HAZARDOUS WASTE CONTACTS

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National Center for Policy Alternatives
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National Conference of State Legislatures
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Southwest Research & Information Center
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Albuquerque, NM 87106
Don Hancock
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Caroline Petti
(202) 457-0545

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Washington, D.C. 20006
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For a directory of the U.S. EPA national and regional offices, U.S state and local hazardous waste management agencies, Canadian federal, provincial, and local agencies, and the International Joint Commission see "1986 APCA Government Agencies Directory," *Journal of the Air Pollution Control Association*, Pittsburgh, PA, April 1986, vol 36, no.4, pp.445-477.

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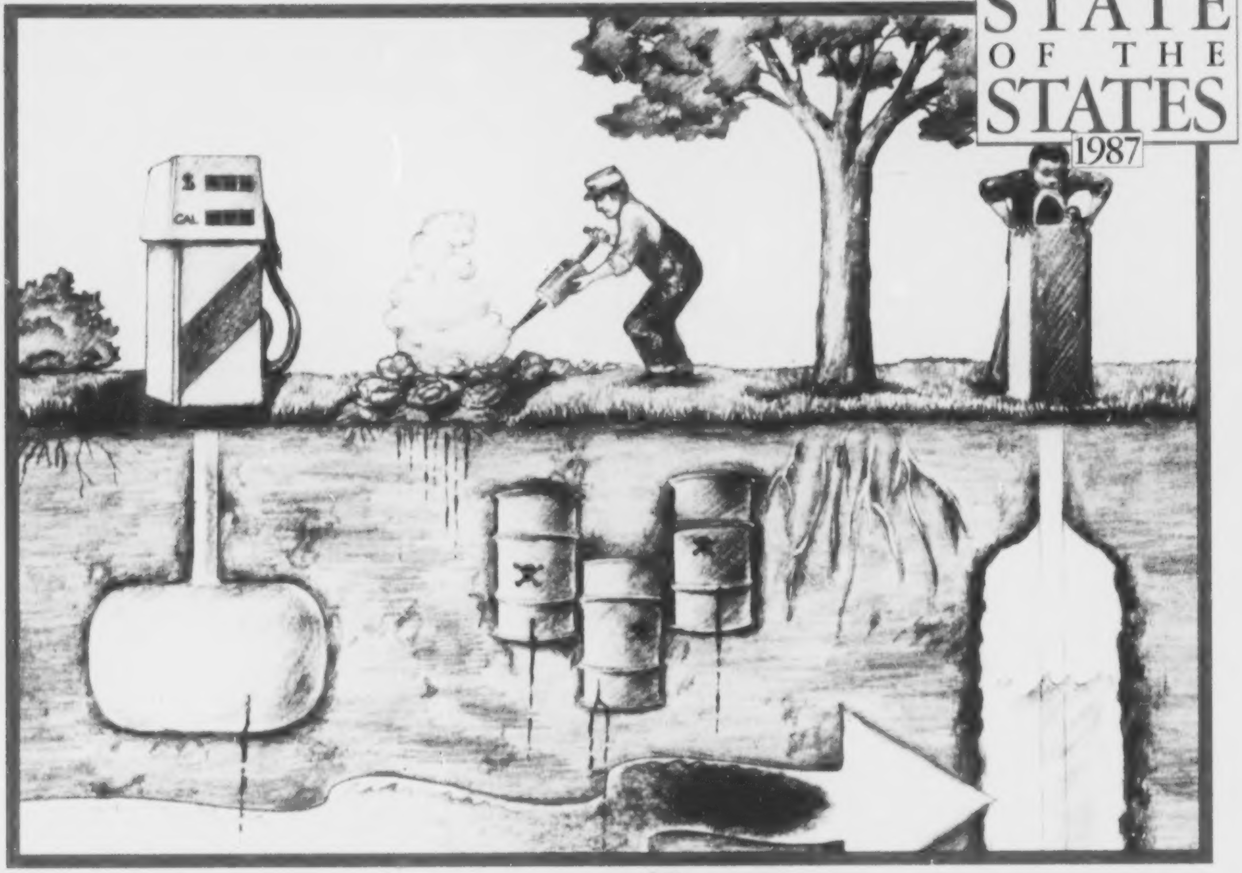
THE STATE OF THE STATES 1987



GROUNDWATER PROTECTION

5

APPENDIX

FUND FOR RENEWABLE ENERGY & THE ENVIRONMENT

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Introduction

The Groundwater Protection Appendix, one of six appendices designed to supplement the data presented in the 1987 State of the States report, has been compiled to allow a more detailed look at groundwater protection on the state level. It provides a national picture of groundwater protection efforts through maps and detailed information, and it allows comparison of the problems states face and their legislative and program responses.

Information from the main report--state rankings, primary map, brief text, and primary matrix are presented in the forward section of the packet. Additional matrix information and maps, as well as groundwater protection contacts are also included.

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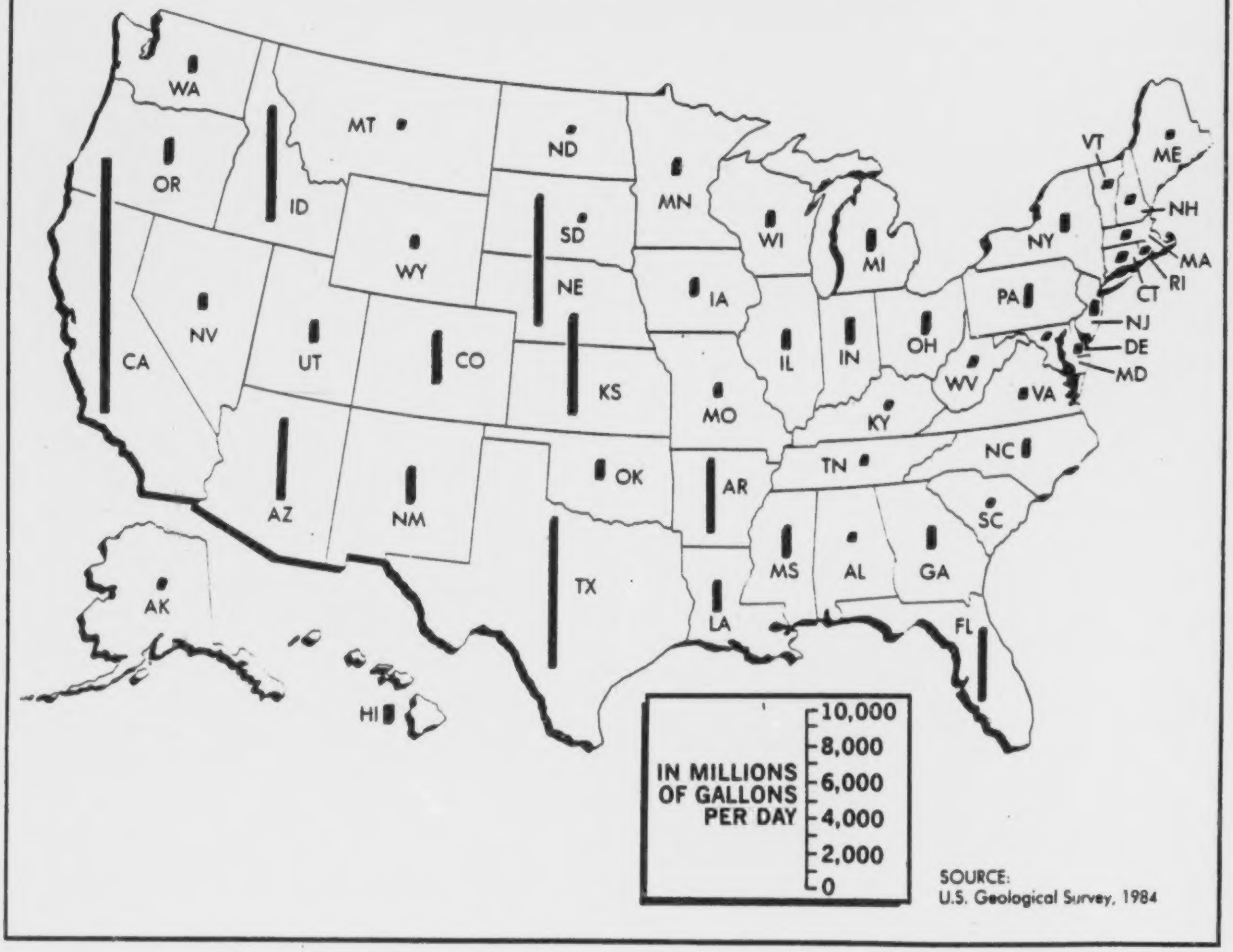
STATE ABBREVIATIONS

AL	ALABAMA
AK	ALASKA
AZ	ARIZONA
AR	ARKANSAS
CA	CALIFORNIA
CO	COLORADO
CT	CONNECTICUT
DE	DELAWARE
FL	FLORIDA
GA	GEORGIA
HI	HAWAII
ID	IDAHO
IL	ILLINOIS
IN	INDIANA
IA	IOWA
KS	KANSAS
KY	KENTUCKY
LA	LOUISIANA
ME	MAINE
MA	MASSACHUSETTS
MI	MICHIGAN
MN	MINNESOTA
MS	MISSISSIPPI
MO	MISSOURI
MT	MONTANA
NE	NEBRASKA
NV	NEVADA
NH	NEW HAMPSHIRE
NJ	NEW JERSEY
NM	NEW MEXICO
NY	NEW YORK
NC	NORTH CAROLINA
ND	NORTH DAKOTA
OH	OHIO
OK	OKLAHOMA
OR	OREGON
PA	PENNSYLVANIA
RI	RHODE ISLAND
SC	SOUTH CAROLINA
SD	SOUTH DAKOTA
TN	TENNESSEE
TX	TEXAS
UT	UTAH
VT	VERMONT
VA	VIRGINIA
WA	WASHINGTON
WV	WEST VIRGINIA
WI	WISCONSIN
WY	WYOMING

STATE PROGRAM RANKINGS: HOW STATES MEASURE UP

	AIR PROGRAMS	SOIL CONSERVATION PROGRAMS	GROUNDWATER PROGRAMS	HAZARDOUS WASTE PROGRAMS	SOLID WASTE PROGRAMS	RENEWABLE ENERGY & ENERGY CONSERVATION	TOTAL	RANK
AL	3	3	2	3	3	2	16	26
AK	7	3	3	2	2	1	18	25
AZ	7	3	7	5	2	3	27	19
AR	1	3	2	5	3	4	18	25
CA	10	3	7	9	9	10	48	2
CO	4	6	4	3	4	3	24	21
CT	9	6	9	4	9	7	44	4
DE	1	8	6	3	4	2	24	21
FL	7	4	9	8	6	7	41	7
GA	4	5	7	4	3	3	26	20
HI	4	4	3	2	2	4	19	24
ID	2	1	6	1	2	6	18	25
IL	7	9	5	7	7	6	41	7
IN	6	5	4	6	7	8	36	10
IA	5	10	5	5	7	7	39	8
KS	2	5	8	8	4	2	29	17
KY	7	3	1	6	8	3	28	18
LA	5	3	3	7	2	1	21	23
ME	3	6	7	6	6	8	36	10
MD	3	8	7	6	6	4	34	12
MA	6	4	8	9	6	8	41	7
MI	8	7	8	9	8	3	43	5
MN	5	6	5	9	9	4	38	9
MS	1	3	2	4	2	2	14	28
MO	5	6	7	8	1	4	31	15
MT	2	5	6	3	1	6	23	22
NE	4	6	6	2	6	7	31	15
NV	2	6	4	2	2	7	23	22
NH	6	5	5	7	5	4	32	14
NJ	9	6	7	10	10	5	47	3
NM	1	2	8	5	1	6	23	22
NY	5	5	10	8	8	7	43	5
NC	8	7	8	6	6	7	42	6
ND	1	3	4	2	3	3	16	26
OH	8	8	4	5	5	4	34	12
OK	5	5	5	4	7	3	29	17
OR	6	2	7	5	7	8	35	11
PA	8	6	5	5	3	5	32	14
RI	6	4	6	4	7	3	30	16
SC	6	5	7	5	2	6	31	15
SD	1	8	6	2	2	4	23	22
TN	3	3	4	7	5	7	29	17
TX	7	2	2	5	3	7	26	20
UT	3	4	3	2	1	3	16	26
VT	3	3	5	6	4	7	28	18
VA	8	7	6	2	3	7	33	13
WA	8	1	6	5	5	3	29	17
WV	2	5	2	4	1	1	15	27
WI	9	8	8	7	8	9	49	1
WY	1	3	8	1	2	1	16	26

GROUNDWATER WITHDRAWALS


WA
OR
CA
ID
NV
MT
WY
UT
AZ
CO
NM
ND
SD
NE
KS
OK
TX
MN
IA
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MS
MI
IN
KY
TN
AL
OH
WV
VA
NC
SC
GA
FL
PA
NY
VT
ME
NH
MA
RI
CT
NJ
DE
MD
AK
HI
IN MILLIONS OF GALLONS PER DAY
10,000
8,000
6,000
4,000
2,000
0

SOURCE:
U.S. Geological Survey, 1984

GROUNDWATER PROTECTION--THE BIG PICTURE

Groundwater is the nation's great hidden resource. It supplies drinking water for half our population. The nation's agricultural system is dependent on it. And its quality has a direct affect on our health. In total, underground aquifers in the United States are estimated to contain 16 times as much water as the Great Lakes. But despite this gigantic total volume, many individual aquifers face serious threats of contamination, depletion, or both.

It takes a daily leak of only a single gallon of gasoline, for example, to contaminate millions of gallons of water. A report issued by the U.S. Environmental Protection Agency in August 1986 indicates as many as 300,000 underground storage tanks are leaking into the subsoil. Another EPA document identifies 12,442 incidents of leaking underground storage tanks reported to state governments.

Groundwater supplies are also threatened by "nonpoint source" pollution--agricultural runoff from pesticides, herbicides, and salt leached from highways. In rural areas where 90 percent of the population is dependent on groundwater for drinking, heavy use of chemicals on the land over the past thirty years has resulted in steadily increasing contamination.

To address the problem of groundwater contamination most states need technical assistance, as well as funding and models for research and legislation. Twenty-eight states currently have groundwater strategy plans in place, but the adequacy of the plans varies widely. The most stringent policy, passed by nine states, mandates nondegradation of water quality. Five other states allow limited degradation, and the remainder have no formal policy. Land-use policies to protect groundwater recharge areas such as swamps are vital to long term progress.

The federal government currently helps states to oversee groundwater protection with a patchwork of sixteen federal laws. Federal soil erosion laws aim at reducing nonpoint source pollution, for example, and the Resource Conservation and Recovery Act requires groundwater monitoring at hazardous waste and solid waste dumpsites. Currently more than two dozen federal agencies and offices are responsible for some aspect of groundwater protection.

Support is now building for consolidation of federal groundwater laws and oversight. Legislation is expected to propose establishment of a national groundwater protection goal and an interagency task force. This should provide a stimulus and context for continuing state efforts.

GROUNDWATER SNAPSHOT

The state of New York has formulated the best policies for groundwater protection. More than six million of the state's 18 million residents rely on groundwater for drinking supplies. Half of those consumers live on Long Island where there have been acute groundwater problems. The state Department of Health and the Department of Environmental Conservation work with a variety of local agencies to implement land-use control of aquifer recharge areas, and monitor for pesticides, salt water intrusion, hazardous waste, and non-hazardous waste. The state has also formulated laws to detect and prevent pollution from leaking underground storage tanks and adminsters a well permit program that regulates all major groundwater withdrawals.

RANKING NOTES

States were ranked on a scale of one to ten on the strength of their environmental policies. The rank is not meant to judge particular environmental conditions in each state, but considers environmental problems as a need for program strength. Key factors weighed against this need are: legislative authority for programs, scope of established programs, extent of funding, monitoring and enforcement, and indications of progress. Although institutionalized programs rather than innovative projects are given greater weight--attention is given to assure that states did not simply "paper over" a problem with legislation.

The broad indicators of a need for groundwater protection are the amount of groundwater withdrawal per day and the percentage of population served by groundwater. Legislative authority to implement a strategy plan and the existence of a plan were considered essential to progress. Added to this are programs for mapping, groundwater quality standards with more than two categories, and state policies for controlled land-use areas. The strongest state programs allowed for a variety of monitoring at suspected contamination sites, had well-integrated state and local programs, and advocated non-degradation or limited degradation of groundwater supplies.

Consideration was also made of the existence or extent of laws and regulations to addresss leaking underground storage tanks.

GROUNDWATER MATRIX

	LEGISLATIVE AUTHORITY TO IMPLEMENT STRATEGY MNGT. PLAN	GROUNDWATER STRATEGY MNGT. PLAN IN PLACE	GROUNDWATER QUALITY STAND. IN PLACE	STRATEGY PLAN INCLUDES MAPPING	LEAKING UNDERGROUND STORAGE TANK LEGISLATION	NON-DEGREDATION OR LIMITED DEGREDATION AS STATE POLICY	MONITORING FOR PESTICIDES, SALT WATER INTRUSION, HAZ. WASTE, NON-HAZ. WASTE	STATE POLICY FOR CONTROLLED LAND USE AREAS	PERCENTAGE OF POPULATION SERVED BY GROUNDWATER	GROUNDWATER WITHDRAWAL PER DAY (MGAL)
AL							NH,SW,HW		52%	.290
AK			•				P		69	49
AZ	•	•					P,HW,NH	•	65	4,200
AR							HW		50	4,300
CA	•			•	•	N	P,HW		46	14,600
CO	•	•			•			•	15	2,800
CT	•	•	•	•	•		P,HW,NH		32	150
DE	•	•		•	•		P,HW,NH		60	82
FL	•	•	•		•		P,SW,NH	•	90	3,800
GA	•	•		•		N	P,SW,HW,NH		48	1,200
HI		•		•			P	•	95	710
ID	•	•		•			P,HW,NH	•	88	6,300
IL	•	•	•	•			HW		49	980
IN	•	•		•			HW		32	1,200
IA	•				•	N	P	•	82	900
KS	•	•		•	•		P,SW,HW,NH	•	49	5,600
KY	•								31	180
LA					•		HW	•	69	1,800
ME	•	•		•	•	N	P,HW,NH		57	80
MD	•		•		•		HW,NH		30	175
MA	•	•	•	•			P,HW,NH		33	320
MI	•	•	•		•	N	HW,NH	•	43	530
MN	•		•				P,HW,NH	•	75	670
MS	•							•	93	1,500
MO	•		•	•		N	P,HW		34	470
MT			•			N	P	•	54	200
NE	•	•	•	•			NH	•	82	7,100
NV	•						HW,NH	•	50	710
NH			•		•	N	P,HW,NH		60	65
NJ	•	•	•	•			HW,SW,NH	•	45	.730
NM	•	•	•	•		L	P,SW,HW,NH	•	89	1,800
NY	•	•	•	•	•	L	P,SW,HW,NH	•	35	970
NC	•	•	•	•	•		HW,SW,NH	•	55	770
ND	•			•			P,HW,NH		62	110
OH	•			•			HW,NH		42	740
OK	•	•		•	•		P		41	960
OR	•	•				L	P,HW,NH	•	61	1,100
PA	•			•		L	P,HW,	•	44	1,000
RI	•	•		•		N	P,HW,NH		24	37
SC		•	•	•	•		P,SW,HW,NH	•	42	210
SD		•		•	•		P,HW,NH		77	330
TN		•	•	•			P		51	460
TX							P,SW,HW,NH	•	47	9,700
UT					•			•	63	772
VT		•			•		P,HW,NH		56	45
VA		•	•	•			P,SW,HW	•	46	370
WA	•			•			P,SW,HW,NH	•	71	750
WV				•			P,HW		53	220
WI	•		•		•	L	P,HW,NH		70	580
WY	•	•	•	•	•		NH	•	54	540

1. Legislative authority to implement a groundwater strategy plan is one of the most fundamental measures a state can undertake.
Source: Association of State and Interstate Water Pollution Control Administrators, Washington, D.C.

2. Leaking Underground storage tank legislative information is from US EPA, Office of Underground Storage Tanks, Washington, DC.

3. Nondegradation policy information is from ASIWPCA, 1985.

4. Monitoring information is from: US EPA, Office of Groundwater Protection, *State Groundwater Program Summaries,* Vol. 2, Washington, DC, 1985.

5. Figures on groundwater consumption and withdrawal are from: US Geological Survey, *National Water Summary*, Washington, DC. 1984.

SCOPE OF STATE PROGRAMS

STATE	MONITORS GROUNDWATER FOR PESTICIDES	MONITORS NON-HAZARDOUS WASTE SITES	MONITORS SALT WATER INTRUSION	AMBIENT MONITORING	MONITORS HAZARDOUS WASTE SITES	MINING CONTAMINATION COVERED BY STATUTE	OIL & GAS CONTAMINATION COVERED BY STATUTE		
AL		X	X	X	X	X	X		
AK	X						X		
AZ	X	X		X	X		X		
AR				X	X	X	X		
CA	X			X	X	X			
CO				X		X	X		
CT	X	X			X				
DE	X	X			X		X		
FL	X	X	X			X	X		
GA	X	X	X	X	X	X	X		
HI	X								
ID	X	X		X	X		X		
IL				X	X		X		
IN				X	X				
IA	X			X		X	X		
KS	X	X	X	X	X	X	X		
KY									
LA				X	X	X	X		
ME	X	X			X	X	X		
MD		X		X	X		X		
MA	X	X			X				
MI	X	X			X	X	X		
MN	X	X		X	X				
MS				X			X		
MO	X			X	X		X		
MT	X					X	X		
NE		X		X		X	X		
NV		X			X	X	X		
NH	X	X			X	X			
NJ		X	X	X	X	X			
NM	X	X	X	X	X	X	X		
NY	X	X	X	X	X	X	X		
NC	X	X	X	X	X		X		
ND	X	X		X	X	X	X		
OH		X		X	X	X	X		
OK	X			X		X	X		
OR	X	X		X	X		X		
PA	X				X				
RI	X	X			X				
SC	X	X	X	X	X		X		
SD	X	X		X	X				
TN	X			X			X		
TX	X	X	X	X	X	X	X		
UT				X			X		
VT	X	X			X	X	X		
VA	X		X	X	X		X		
WA	X	X	X	X	X	X	X		
WV	X				X		X		
WI	X	X		X	X		X		
WY		X		X		X	X		

SCOPE OF STATE PROGRAMS

STATE	MONITORING NETWORK	WELL DRILLERS LICENSING	CONTROLLED USE AREAS	UNDERGROUND INJECTION CONTROL PRIMACY	LEAKING UNDERGROUND STORAGE TANK LEGISLATION	GROUNDWATER ASSESSMENT AT WASTE SITES	NON-DEGRADATION POLICY		
AL		X		X					
AK		X							
AZ		X	X			X			
AR	X			X					
CA	X			X	X	X	X		
CO		X	X						
CT	X	X		X	X	X			
DE	X	X		X					
FL	X	X	X	X	X	X			
GA	X	X		X			X		
HI			X						
ID		X	X	X		X			
IL	X			X		X			
IN						X			
IA	X		X			X	X		
KS	X	X	X	X	X	X			
KY									
LA	X		X	X	X	X			
ME				X	X	X	X		
MD	X	X		X	X	X			
MA	X			X		X			
MI	X	X	X		X	X	X		
MN	X	X	X			X			
MS	X	X	X	X		X			
MO	X			X			X		
MT		X	X				X		
NE			X	X					
NV			X			X			
NH		X		X	X	X	X		
NJ	X		X	X		X			
NM	X	X	X	X					
NY			X		X	X			
NC	X		X	X	X	X			
ND				X		X			
OH				X		X			
OK	X	X		X					
OR		X	X	X		X			
PA		X	X						
RI	X	X		X	X	X	X		
SC	X	X	X	X	X	X			
SD		X		X					
TN		X							
TX	X	X	X	X					
UT	X	X	X	X					
VT	X	X		X		X			
VA			X						
WA		X	X	X		X			
WV				X					
WI		X		X		X			
WY			X	X		X			

MAJOR SOURCES OF CONTAMINATION

STATE	SEPTIC TANKS	MUNICIPAL LANDFILLS	ON-SITE INDUSTRIAL LANDFILLS	OTHER LANDFILLS	SURFACE IMPOUNDMENTS	OIL & GAS BRINE PITS	UNDERGROUND STORAGE TANKS	INJECTION WELLS	ABANDONED HAZARDOUS WASTE SITES	
AL		X	X	X	X	X	X	X	X	
AK	X	X					X			
AZ		X		X	X		X		X	
AR				X		X				
CA		X	X		X		X		X	
CO	X		X	X	X	X	X		X	
CT		X	X		X		X			
DE		X	X	X			X			
FL	X	X	X	X	X		X	X	X	
GA	X				X			X		
HI	X							X		
ID	X				X		X	X		
IL	X		X				X	X		
IN			X				X	X	X	
IA	X	X			X		X	X	X	
KS						X				
KY		X	X	X				X	X	
LA				X	X	X	X	X		
ME	X	X	X		X		X		X	
MD	X	X	X	X	X	X	X	X	X	
MA	X	X	X		X		X		X	
MI		X	X	X	X	X	X		X	
MN	X	X	X	X	X		X	X	X	
MS	X	X	X			X	X	X		
MO	X									
MT	X	X		X		X	X	X		
NE	X	X		X	X	X			X	
NV	X				X		X			
NH	X	X	X		X		X			
NJ	X	X	X	X	X	X	X	X	X	
NM	X				X	X	X		X	
NY	X	X	X	X			X		X	
NC		X	X		X		X			
ND	X	X	X	X	X	X	X	X	X	
OH	X		X	X	X	X				
OK							X			
OR	X	X	X				X	X	X	
PA	X	X	X	X	X	X		X		
RI	X	X	X		X	X	X		X	
SC		X	X	X	X		X		X	
SD	X	X	X	X	X	X	X			
TN	X		X		X	X	X	X	X	
TX	X	X	X		X		X		X	
UT				X		X	X			
VT	X	X	X		X		X		X	
VA	X				X		X			
WA	X	X			X		X	X	X	
WV			X		X	X				
WI	X						X		X	
WY	X					X	X			

MAJOR SOURCES OF CONTAMINATION

STATE	REGULATED HAZARDOUS WASTE SITES	SALT WATER INTRUSION	LAND APPLICATION/ TREATMENT	AGRICULTURAL	ROAD SALTINE	MINE CONTAMINATION	WELLS	SPILLS
AL	X	X	X	X				
AK				X				
AZ								
AR		X						X
CA	X			X				
CO				X		X		
CT				X	X			X
DE		X		X				
FL		X		X				
GA		X		X				
HI				X				
ID			X	X				
IL	X			X		X		X
IN								
IA			X	X				
KS	X						X	X
KY						X		
LA	X			X			X	
ME		X		X	X			
MD	X	X	X	X	X			
MA				X	X			
MI				X	X			
MN	X		X	X	X			
MS		X						
MO	X					X	X	X
MT		X				X		X
NE				X				
NV						X		
NH					X			
NJ	X	X	X	X	X	X	X	X
NM				X		X		
NY				X				X
NC		X						X
ND								
OH	X				X		X	
OK		X						
OR	X			X				
PA						X		
RI				X	X			
SC	X	X	X	X				
SD				X			X	
TN	X			X		X		
TX		X		X			X	
UT						X		X
VT				X	X			
VA								
WA		X		X				
WV						X	X	
WI				X			X	X
WY						X		

Summary of fresh ground-water withdrawals as a percentage of total fresh surface- and ground-water withdrawals for all categories of use and for specific categories of use, by State

[Data rounded to two significant figures. Data not included for Trust Territory of the Pacific Islands, Saipan, Guam, and American Samoa. Mgal = million gallons. Sources: State data from table 1 in respective State summary, *National Water Summary 1984*; total data from Solley, Chase, and Mann, 1983]

State	Total surface- and ground-water withdrawals per day (Mgal)	Percentage of population served by ground water	Ground-water withdrawals per day (Mgal)	Ground-water withdrawals as a percentage of total fresh surface- and ground-water withdrawals for—					
				All categories of use[1]	Specific categories of use				
					Public supply	Rural supply		Industrial self-supplied[1]	Irrigation
						Domestic	Livestock		
Alabama	8,700	52	290	3 (14)	28	100	34	0.6 (4)	30
Alaska	220	69	49	22 (26)	43	99	0	9 (11)	0
Arizona	7,300	65	4,200	58 (57)	54	100	82	72 (88)	58
Arkansas	33,000	50	4,300	13 (81)	42	100	36	1 (55)	86
California	38,000	46	14,600	39 (38)	46	93	41	54 (89)	39
Colorado	16,000	15	2,800	18 (18)	8	36	18	2 (1)	19
Connecticut	1,300	32	150	11 (20)	17	100	18	3 (10)	8
Delaware	140	60	82	59 (57)	38	100	100	68 (73)	63
District of Columbia	340	0	.8	.2 (.4)	0	0	0	.6 (57)	0
Florida	7,300	90	3,800	52 (69)	86	100	66	27 (82)	53
Georgia	6,700	48	1,200	18 (52)	29	100	61	8 (57)	66
Hawaii	1,700	95	710	41 (37)	90	90	96	73 (20)	93
Idaho	18,000	88	6,300	35 (35)	94	96	42	95 (95)	25
Illinois	18,000	49	980	5 (24)	27	97	100	1 (10)	100
Indiana	14,000	32	1,200	11 (30)	41	90	18	8 (18)	98
Iowa	3,200	82	900	28 (81)	81	100	100	13 (71)	84
Kansas	6,600	49	5,600	85 (89)	48	86	43	35 (77)	92
Kentucky	4,600	31	180	4 (22)	13	91	5	2 (25)	6
Louisiana	12,000	69	1,800	14 (27)	44	100	70	5 (12)	47
Maine	850	57	80	9 (10)	19	98	59	5 (5)	3
Maryland	1,400	30	175	13 (17)	9	100	54	6 (18)	54
Massachusetts	2,500	33	320	13 (28)	24	100	58	6 (30)	28
Michigan	15,000	43	530	4 (18)	17	100	77	1 (3)	37
Minnesota	3,100	75	670	22 (48)	52	100	85	5 (20)	88
Mississippi	2,900	93	1,500	54 (82)	18	100	77	21 (61)	35
Missouri	6,900	34	470	7 (34)	22	74	26	2 (39)	75
Montana	11,000	54	200	2 (2)	39	94	38	20 (52)	1
Nebraska	12,000	82	7,100	59 (73)	77	100	80	3 (85)	67
Nevada	3,600	50	710	20 (20)	40	94	31	30 (45)	17
New Hampshire	380	60	65	17 (21)	48	98	25	5 (6)	0
New Jersey	2,900	45	730	25 (37)	40	100	67	10 (20)	73
New Mexico	3,900	89	1,800	47 (47)	90	97	50	25 (98)	44
New York	7,900	35	970	12 (28)	23	89	65	4 (11)	46
North Carolina	8,100	55	770	10 (20)	12	100	85	6 (17)	30
North Dakota	1,000	62	110	11 (11)	54	100	40	.3 (25)	37
Ohio	13,000	42	740	6 (32)	27	90	60*	2 (16)	36
Oklahoma	1,700	41	960	56 (61)	28	83	12	23 (35)	84
Oregon	6,800	61	1,100	17 (17)	29	87	27	15 (16)	14
Pennsylvania	16,000	44	1,000	6 (16)	16	100	88	4 (15)	14
Puerto Rico	1,100	26	246	22 (35)	22	42	50	3 (21)	34
Rhode Island	170	24	37	22 (21)	15	100	50	36 (36)	9
South Carolina	5,800	42	210	4 (21)	22	100	55	1 (5)	27
South Dakota	690	77	330	48 (48)	68	94	88	54 (55)	33
Tennessee	10,000	51	460	5 (21)	40	100	17	2 (11)	51
Texas	16,000	47	9,700	61 (62)	46	84	49	23 (24)	70
Utah	4,300	63	770	18 (18)	66	90	80	14 (16)	10
U.S. Virgin Islands	6	42	1.1	18 (18)	12	100	0	0 (0)	0
Vermont	340	54	45	13 (50)	35	85	62	2 (35)	19
Virginia	5,600	41	370	7 (30)	17	100	10	2 (24)	29
Washington	8,200	71	750	9 (9)	37	78	67	15 (15)	4
West Virginia	5,600	53	220	4 (22)	27	95	13	3 (18)	8
Wisconsin	5,900	70	580	10 (46)	48	100	96	1 (15)	97
Wyoming	5,300	54	540	10 (11)	33	92	21	34 (76)	8
Total or percentage	380,000	51	88,000	23 (38)	35	97	55	6 (26)	40

---

[1] Number in parentheses was calculated excluding thermoelectric po

INCIDENTS OF LEAKING UNDERGROUND STORAGE TANKS REPORTED TO STATES

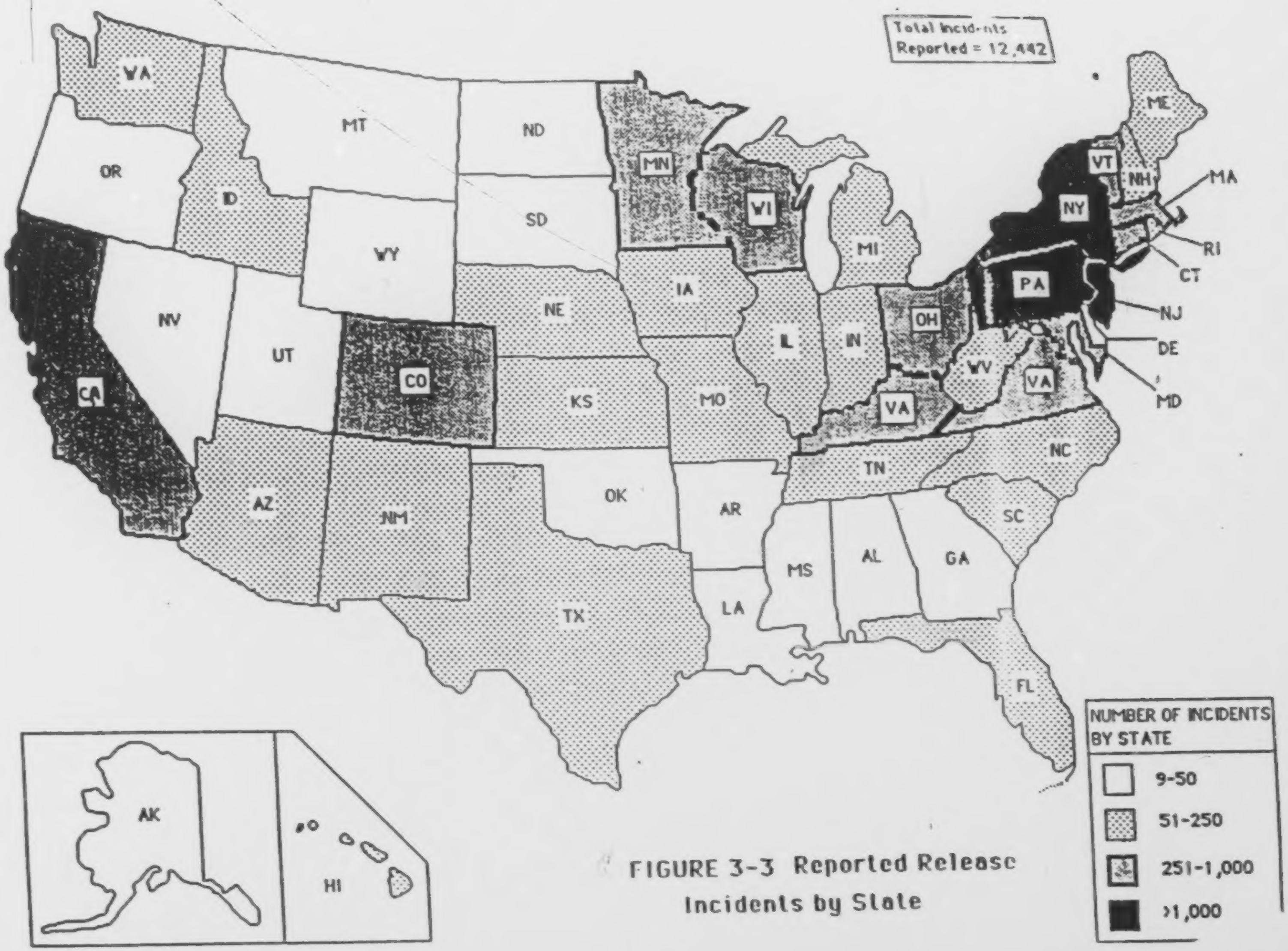
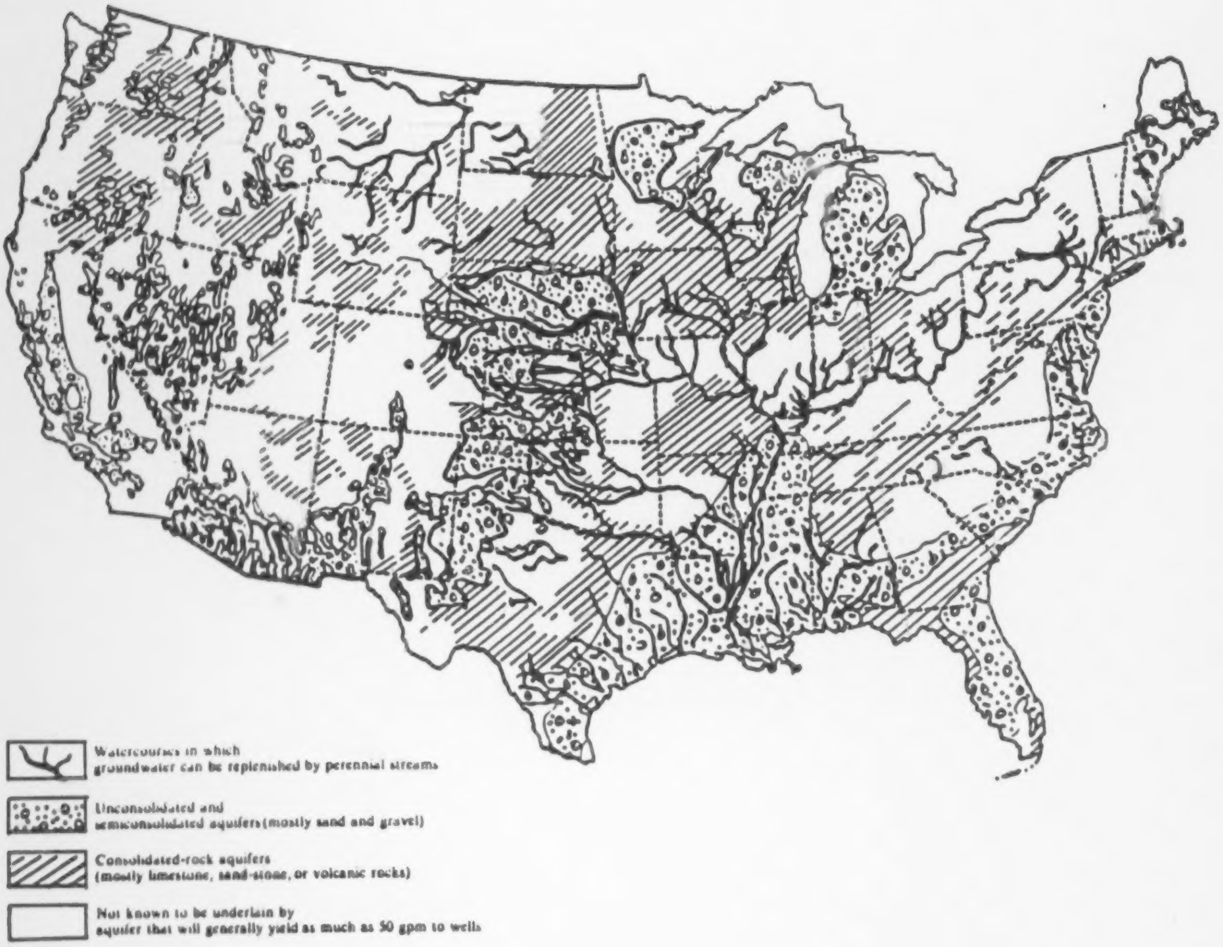

Total Incidents
Reported = 12,442
WA
OR
CA
ID
NV
MT
WY
UT
AZ
CO
NM
ND
SD
NE
KS
OK
TX
MN
IA
MO
AR
LA
WI
IL
MS
MI
IN
TN
AL
OH
VA
WV
VA
NC
SC
GA
FL
NY
PA
VT
NH
ME
MA
RI
CT
NJ
DE
MD
AK
HI
NUMBER OF INCIDENTS BY STATE
9-50
51-250
251-1,000
>1,000

FIGURE 3-3 Reported Release Incidents by State

Major aquifers in the continental United States


Watercourses in which groundwater can be replenished by perennial streams
Unconsolidated and semiconsolidated aquifers (mostly sand and gravel)
Consolidated-rock aquifers (mostly limestone, sand-stone, or volcanic rocks)
Not known to be underlain by aquifer that will generally yield as much as 50 gpm to wells

Source: Groundwater: A Community Action Guide, Concern, Inc.
Washington, D.C., 1984

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THE STATE OF THE STATES 1987

RENEWABLE ENERGY & CONSERVATION

6

APPENDIX

FUND FOR RENEWABLE ENERGY & THE ENVIRONMENT

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Introduction

The Renewable Energy and Conservation Appendix, one of six appendices designed to supplement the information presented in the 1987 State of the States report, has been compiled to allow a more detailed look at renewable energy and conservation on the state level. It provides a national picture of the topic through key data, and it allows a comparison of actions have taken to make energy supply more secure and its use more efficient. Information from the main report--state rankings, primary map, brief text, and primary matrix are presented in the forward portion of the packet. Additional information and maps, as well as renewable energy and conservation contacts are also included.

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STATE ABBREVIATIONS

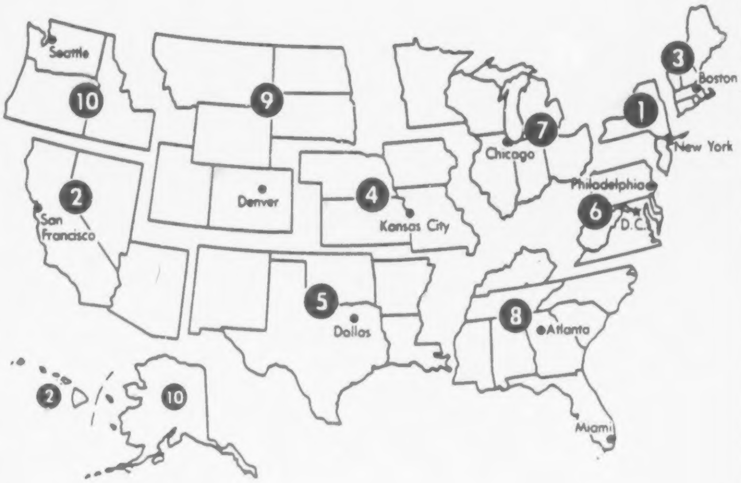
AL	ALABAMA
AK	ALASKA
AZ	ARIZONA
AR	ARKANSAS
CA	CALIFORNIA
CO	COLORADO
CT	CONNECTICUT
DE	DELAWARE
FL	FLORIDA
GA	GEORGIA
HI	HAWAII
ID	IDAHO
IL	ILLINOIS
IN	INDIANA
IA	IOWA
KS	KANSAS
KY	KENTUCKY
LA	LOUISIANA
ME	MAINE
MA	MASSACHUSETTS
MI	MICHIGAN
MN	MINNESOTA
MS	MISSISSIPPI
MO	MISSOURI
MT	MONTANA
NE	NEBRASKA
NV	NEVADA
NH	NEW HAMPSHIRE
NJ	NEW JERSEY
NM	NEW MEXICO
NY	NEW YORK
NC	NORTH CAROLINA
ND	NORTH DAKOTA
OH	OHIO
OK	OKLAHOMA
OR	OREGON
PA	PENNSYLVANIA
RI	RHODE ISLAND
SC	SOUTH CAROLINA
SD	SOUTH DAKOTA
TN	TENNESSEE
TX	TEXAS
UT	UTAH
VT	VERMONT
VA	VIRGINIA
WA	WASHINGTON
WV	WEST VIRGINIA
WI	WISCONSIN
WY	WYOMING

STATE PROGRAM RANKINGS: HOW STATES MEASURE UP

	AIR PROGRAMS	SOIL CONSERVATION PROGRAMS	GROUNDWATER PROGRAMS	HAZARDOUS WASTE PROGRAMS	SOLID WASTE PROGRAMS	RENEWABLE ENERGY & ENERGY CONSERVATION	TOTAL	RANK
AL	3	3	2	3	3	2	16	26
AK	7	3	3	2	2	1	18	25
AZ	7	3	7	5	2	3	27	19
AR	1	3	2	5	3	4	18	25
CA	10	3	7	9	9	10	48	2
CO	4	6	4	3	4	3	24	21
CT	9	6	9	4	9	7	44	4
DE	1	8	6	3	4	2	24	21
FL	7	4	9	8	6	7	41	7
GA	4	5	7	4	3	3	26	20
HI	4	4	3	2	2	4	19	24
ID	2	1	6	1	2	6	18	25
IL	7	9	5	7	7	6	41	7
IN	6	5	4	6	7	8	36	10
IA	5	10	5	5	7	7	39	8
KS	2	5	8	8	4	2	29	17
KY	7	3	1	6	8	3	28	18
LA	5	3	3	7	2	1	21	23
ME	3	6	7	6	6	8	36	10
MD	3	8	7	6	6	4	34	12
MA	6	4	8	9	6	8	41	7
MI	8	7	8	9	8	3	43	5
MN	5	6	5	9	9	4	38	9
MS	1	3	2	4	2	2	14	28
MO	5	6	7	8	1	4	31	15
MT	2	5	6	3	1	6	23	22
NE	4	6	6	2	6	7	31	15
NV	2	6	4	2	2	7	23	22
NH	6	5	5	7	5	4	32	14
NJ	9	6	7	10	10	5	47	3
NM	1	2	8	5	1	6	23	22
NY	5	5	10	8	8	7	43	5
NC	8	7	8	6	6	7	42	6
ND	1	3	4	2	3	3	16	26
OH	8	8	4	5	5	4	34	12
OK	5	5	5	4	7	3	29	17
OR	6	2	7	5	7	8	35	11
PA	8	6	5	5	3	5	32	14
RI	6	4	6	4	7	3	30	16
SC	6	5	7	5	2	6	31	15
SD	1	8	6	2	2	4	23	22
TN	3	3	4	7	5	7	29	17
TX	7	2	2	5	3	7	26	20
UT	3	4	3	2	1	3	16	26
VT	3	3	5	6	4	7	28	18
VA	8	7	6	2	3	7	33	13
WA	8	1	6	5	5	3	29	17
WV	2	5	2	4	1	1	15	27
WI	9	8	8	7	8	9	49	1
WY	1	3	8	1	2	1	16	26

AVERAGE ENERGY BILL FOR ELECTRICITY, FUEL OIL, AND NATURAL GAS

	Electricity[1] (cents per kilowatt hour)	Fuel Oil[2] (cents per gallon)	Natural Gas[3] ($'s per 1000 cubic foot)
Northeast (#1)	11.63		
New York		101.8	$6.01-7.00
New Jersey		96.2	6.01-7.00
Pacific (#2)	9.64		
California		NA	5.01-6.00
Nevada		NA	5.01-6.00
Arizona		NA	5.01-6.00
Hawaii		NA	> 7.01
New England (#3)	9.21		
Connecticut		103.5	> 7.01
Maine		96.0	> 7.01
Massachusetts		99.9	6.01-7.00
New Hampshire		97.4	6.01-7.00
Rhode Island		107.9	6.01-7.00
Vermont		102.1	5.01-6.00
Central Plain (#4)	8.62		
Kansas		NA	3.10-4.00
Iowa		NA	4.01-5.00
Missouri		NA	5.01-6.00
Nebraska		NA	4.01-5.00
Southwest (#5)	8.46		
New Mexico		NA	4.01-5.00
Oklahoma		NA	3.01-4.00
Arkansas		NA	3.01-4.00
Louisiana		NA	3.01-4.00
Texas		NA	3.01-4.00
Mid-Atlantic (#6)	8.10		
Pennsylvania		93.1	5.01-6.00
Delaware		96.7	6.01-7.00
Maryland		94.1	6.01-7.00
District of Columbia		92.4	6.01-7.00
Virginia		89.7	5.01-6.00
West Virginia		87.7	5.01-6.00
Midwest (#7)	8.06		
Michigan		92.0	5.01-6.00
Ohio		86.6	5.01-6.00
Illinois		85.8	5.01-6.00
Indiana		85.1	4.01-5.00
Wisconsin		90.9	5.01-6.00
Minnesota		91.7	5.01-6.00
Southern (#8)	7.41		
Kentucky		NA	4.01-5.00
Tennessee		NA	4.01-5.00
North Carolina		NA	5.01-6.00
South Carolina		NA	5.01-6.00
Georgia		NA	5.01-6.00
Alabama		NA	4.01-5.00
Mississippi		NA	3.01-4.00
Florida		NA	3.01-4.00
Rocky Mountain (#9)	6.91		
Montana		NA	4.01-5.00
North Dakota		NA	5.01-6.00
South Dakota		NA	4.01-5.00
Wyoming		NA	4.01-5.00
Utah		NA	4.01-5.00
Colorado		NA	4.01-5.00
Northwest (#10)	4.78		
Oregon		84.0	5.01-6.00
Washington		85.3	5.01-6.00
Idaho		89.3	5.01-6.00
Alaska		94.1	0.0-3.00



[1] **Electricity:** Figures are for 210 major private power companies and do not includes rates for 2,194 public power systems (which average 30 percent less); rates are not included for 870 rural electric cooperatives. Private power companies provide 78 percent of the nation's electricity.
Figures denote average cost in cents per kilowatt hour at 500 kilowatt hour rate. Nationwide average for 1984: 8.22 cents per kwh. The regional grouping of states is NARUC's. (source: National Association of Regulatory Utility Commissioners, Washington, D.C.).

[2] **Fuel Oil:** Fuel oil prices are for No. 2 distillate at average 1985 residential end-user rates excluding tax. EIA has not gathered information for many states which it considers low volume users. (source: Energy Information Administration, Washington, D.C.)

[3] **Natural Gas:** Natural gas prices are 1985 averages for delivery to all types of consumers in dollars per thousand cubic feet. (source: Energy Information Administration, Washington, D.C.)

RENEWABLE ENERGY AND CONSERVATION--THE BIG PICTURE

Every major city and state government faces a quiet crisis over energy use. Even those which now enjoy a glut of electricity or natural gas, or relatively cheap oil, are approaching a period in which planning time and options will begin to close out.

In the last decade, renewable energy and conservation (using energy more efficiently) have become the most promising solutions for avoiding a new energy crisis. Since 1974 more efficient use of energy has helped to diminish projected growth in energy demands for they year 2000 by half--and substantially reduced the need for oil imports and new power plants. Annual growth in electricity needs, for example, has dropped from seven percent per year to less than two percent per year. Overall, the nation is about 24 percent more efficient in its energy use today than in 1973.

It's generally acknowledged that this energy efficiency is only scratching the surface of much greater potential. Efficient light bulbs now on the market have the potential to save half the electricity now used for lighting. Variable drives on electric motors could save one third the electricity they consume. And energy efficient home appliances are projected to save half the electricity they now use. A 1983 Congressional Research Service study reported cost effective conservation potential for 161,000 megawatts of electricity by 1990 and 214,000 megawatts by the year 2000--equal to more than 200 large nuclear plants.

Renewable energy sources such as solar, wind, biomass, hydro, and geothermal also hold bright prospects. In 1979, the federal government estimated 20 percent of the nation's energy could come from renewable energy technologies by the year 2000. Today, renewable energy sources supply 9.6 percent of total U.S. energy production. The problem of doubling renewable energy supply in the next fifteen years--and increasing our energy efficiency as well--is a lack of on-going political commitment.

Energy policy-making is largely crisis oriented. In response to the oil shocks of 1973 and 1979 Congress passed a half dozen laws to stimulate state promotion of renewable energy and energy efficiency. Today, the support for these programs has eroded. Funding for solar research and development was slashed from $771 million in 1981 to $176 million in 1986. Federal income tax credits were eliminated for residential purchase of renewable energy equipment in 1985, and business credits were scheduled for phase out. The Residential Conservation Service budget was cut from $9.2 million in 1981 to $400,000 in 1986. Energy conservation funding for institutional buildings was cut from $159 million in 1981 to $52.5 million in 1986. And state energy conservation funding was cut from $37.2 million to $17.7 million for the same period.

By the end of 1986, seven of the 24 states with tax credits for renewable energy systems had let the provision expire. And as of September 1986, only ten states had passed legislation or adopted regulations to push least-cost energy planning at the state level. And in the absence of federal appliance efficiency standards (which were vetoed by President Reagan in November 1986), three states have passed their own standards.

While headway is being made by a few states and major cities, signficant progress is required to avert or minimize an energy crisis in the next decade. Current federal policies have been paralyzed by the influence of major energy producers. The funding support for nuclear energy, for example, has remained relatively intact at approximately $350 billion per year while the cuts have undermined the potential for renewable energy and conservation. The key to what course events may take rests in large part on politcal choices and price rises in traditional fuels--oil, gas, coal, electricity.

ENERGY SNAPSHOT

California is widely recognized for its encouragement of renewable energy development. The state has formulated the standards, authority, and regulations to require "least-cost" energy development, and until recently offered substantial tax incentives to independent energy developers. Residential and commercial purchasers of renewable energy systems have also received income tax credit which has helped overcome intitial market barriers. In addition to such provisions, California has formulated building codes which require greater energy efficiency, and efficiency standards for a variety of appliances.

Broadening the use of such policies has run into resistance of temporarily low fuel prices and federal policies which emphasize boosting traditional energy supply sources over efficiency measures. Utility and energy companies are also fighting to maintain monopoly control of energy markets and limit competition and efficiency that many view as cutting into their growth in sales and profits.

RANKING NOTES

States were ranked on a scale of one to ten on the strength of their particular policies. Key factors weighed were: legislative authority for programs, scope of established programs, extent of funding, and indications of progress. The emphasis was on states that are attempting to institutionalize energy efficiency into building codes, tax structures, and regulatory policies. Primary consideration was given to states which have formulated comprehensive laws for "least cost" energy planning. The use of tax credits for solar and renewable energy systems, and the extent of utilization of grants and loans from the Solar Energy and Energy Conservation Bank were also assessed as signs of a state's interest and ability to support vital technological progress and savings of fossil fuels.

In addition to these primary indicators, assessment was also made of state policies which allow construction-work-in-progress charges that have encouraged overbuilding of centralized energy systems and undermined renewable energy and energy efficiency development.

ENERGY MATRIX

	LEAST COST PROVISIONS & REGULATIONS*	INCOME TAX CREDITS FOR SOLAR AND RENEWABLE ENERGY SYSTEMS*	TAX CREDIT EXPIRATION DATE	% USE OF AVAILABLE* SOLAR ENERGY & ENERGY CONS. BANK 1982-1986		BUILDING CODE PROVISIONS*	APPLIANCE EFFICIENCY STANDARDS*	CONST. WORK IN PROGRESS POLICY*
				CONSERVATION	SOLAR			
AL	3	N		8.42%	128%			No
AK	3	N		—	—			—
AZ	3	25% res. & comm.	12/87	12.04%	84.38%			partial
AR	2	N		97.67%	—			partial
CA	1	10% res./25% comm.	12/86	79.76%	9.06%	•	•	No
CO	3	30% comm.	12/86	38.88%	—			partial
CT	2	30% comm.	12/86	55.74	87.97			partial
DE	3	$200 flat credited res. only	open-ended	—	8.93			—
FL	1	N		93.95	25.93	•		partial
GA	3	10-20% res. & comm.	12/89	84.11	—			partial
HI	3	15% res. & comm.	12/92	—	53.33			No
ID	2	10% res. only	open-ended	70.30	—			No
IL	1	N		94.01	—			partial
IN	2	25% res. & comm.	12/87	92.06	100			No
IA	1	N		101.19	76.00			No
KS	3	N		82.22	—			partial
KY	3	15% res. & comm.	12/86	74.07	74.00			partial
LA	3	N		—	—			partial
ME	1	20% res.	12/88	79.85	52.00		•	partial
MD	2	N		—	—			partial
MA	2	35% res.	12/87	94.09	97.67	•	•	No
MI	3	15-30% res.	12/88	88	3.25			—
MN	2	N		65.92	11.92	•		partial
MS	3	N		34.74	—			—
MO	2	N		96.42	103.46			No
MT	2	2½ - 5% res. 35% comm.	12/86	43.78	—			No
NE	Public Power	N	12/85	71.83	—			—
NV	1	N		100	—			partial
NH	2	N			76.26			No
NJ	2	N		56.07	—			partial
NM	2	25% res. & comm.	12/89	24.27	87.19			partial
NY	2	N		86.35	7.74	•		partial
NC	2	25% res. & comm.	open-ended	100.50	98.72	•		partial
ND	3	15% res. & comm.	open-ended	26.46	—			short term
OH	2	N		84.82	—			partial
OK	3	55% res./30% comm.	12/90	76.01	—			partial
OR	1	25% res. & 35% comm.	12/89/90	91.54	—			No
PA	2	N		77.80	98.23			partial
RI	3	10% res. & comm.	6/90	72.79	—			No
SC	2	25% res. & comm.	open-ended	50.20	—			partial
SD	3	N		4.54	—	•		No
TN	Public Power	N		79.40	9.13			—
TX	1	N		89.18	—			partial
UT	3	25% res. & comm.	12/90	87.99	107.92			partial
VT	1	N		32.43	—			partial
VA	2	20% res. & comm.	12/86	99.24	73.43			partial
WA	2	N		—	90.23			No
WV	3	N		—	—			partial
WI	1	N		91.92	—	•		partial
WY	3	N		—	—			No

FOOTNOTES TO THE RENEWABLE ENERGY AND CONSERVATION MATRIX

1. Least-cost energy policies of the states were examined by Public Citizen's Critical Mass Energy Project in 1985. The numerical assessment is based on their evaluation of progress of a state toward a comprehenisve model for least-cost strategies:

1= comprehenisve regulatory authority and policies in place which require integrated planning and investment process for utilities;
2= state has made some progress toward least-cost planning process and has some control over utility investment;
3= state has made little progress in implementing policies and authority to encourage least-cost strategies.

Source: Critical Mass Energy Project, Least-Cost Energy Planning: Is There Really A State Movement? Washington, D.C. Dec. 1985.

2. This column addresses state income tax credits only, not rebates or sales tax exemption. Policies for income tax exemption vary widely, but following federal legislation, the general trend is to let state credits expire. "N" signifies no income tax credits.
Source: Solar Rating and Certification Association, State Solar Directory Washington, D.C., 1985 (and personal communication with state officials).

3. More than 80 percent of the total funding for the federal Solar Energy and Energy Conservation Bank was applied to conservation and not solar measures. Many states did not utilize the full amount of funding allocated to them in either category.
Source: Solar Energy and Energy Conservation Bank, data printout, Washington, D.C., July 1986.

4. Although many states have minimal requirements for energy efficiency in new buildings, those with the most substantial standards are included here.
Source: National Conference of States on Building Codes and Standards, Herndon Virginia.

5. Many states are also formulating appliance efficiency standards in the absence of a federal standard, however only three states have currently passed such a law.
Source: American Council for an Energy-Efficient Economy, Washington, D.C.

6. State regulatory policies play an important role in energy development. Construction-work-in-progress charges have been a primary mechanism that allowed the overbuilding of large, centralized electric generating plants in the 1970s and early 1980s--wasting energy capital and resources and undermining the growth of energy efficiency and renewable energy technologies.

Table I.

STATE LEADERS IN THE DEVELOPMENT OF RENEWABLE ENERGY TECHNOLOGIES

Technology	Number of Active States	Total MW On-Line or with Firm Plans	Three States Leaders in Developing Technology (with % of Total MW)
Waste to energy	23	1,664	New York (14.5%), Florida (14.5%), California (12.1%)
Landfill gas	7	44	California (47.5%), Wisconsin (22.7%), New York (20.4%)
Wood	8	771	California (55.9%), Maine (15.8%), Oregon (10.5%)
Geothermal	4	2,404	California (94.9%), Nevada (3.3%), Utah (1.7%)
Wind	7	1,474	California (96.5%), New York (1.2%), Hawaii (1.0%)
Hydro	18	716	Louisiana (26.9%), California (23.7%), New York (17.1%)
Photovoltaics	1	8	California (100%)
Solar thermal	1	211	California (100%)

SOURCE: Investor Responsibility Research Center, Inc.

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Federal Solar Energy and Energy Conservation Bank State Funding

STATE	INITIAL ALLOCATION PLAN	ACTUAL	%	SECOND ALLOCATION PLAN	ACTUAL	%	THIRD ALLOCATION PLAN	ACTUAL	%
Alabama	82,978.00	82,978.00	100.00%	0.00	0.00	ERR	0.00	0.00	ERR
American Somoa	0.00	0.00	ERR	120,000.00	120,000.00	100.00%	0.00	0.00	ERR
Arizona	160,000.00	100,000.00	100.00%	63,100.62	63,100.62	100.00%	0.00	0.00	ERR
Arkansas	540,000.00	540,000.00	100.00%	279,900.00	279,900.00	100.00%	582,600.00	582,600.00	100.00%
California	1,265,000.00	1,265,000.00	100.00%	1,248,700.00	1,248,700.00	100.00%	1,281,700.00	636,811.83	49.68%
Colorado	79,060.47	79,000.47	100.00%	73,457.26	65,548.06	89.23%	162,200.00	101,002.07	62.27%
Connecticut	1,000,000.00	959,906.28	95.99%	204,700.00	188,464.20	92.07%	300,200.00	80,220.27	26.72%
Delaware	0.00	0.00	ERR	53,500.00	10,916.00	20.40%	0.00	0.00	ERR
District of Columbia	58,221.19	58,221.19	100.00%	19,991.83	19,991.83	100.00%	0.00	0.00	ERR
Florida	500,000.00	500,000.00	100.00%	753,800.00	753,800.00	100.00%	707,700.00	538,336.53	76.07%
Georgia	245,072.57	245,072.57	100.00%	187,664.83	187,664.83	100.00%	375,500.00	372,456.24	99.19%
Guam	0.00	0.00	ERR	0.00	0.00	ERR	0.00	0.00	ERR
Hawaii	0.00	0.00	ERR	120,000.00	82,778.90	68.98%	0.00	0.00	ERR
Idaho	391,370.66	391,370.66	100.00%	89,200.00	89,200.00	100.00%	380,129.59	380,129.59	100.00%
Illinois	600,000.00	600,000.00	100.00%	864,700.00	884,700.00	100.00%	968,100.00	968,100.00	100.00%
Indian Tribes	0.00	0.00	ERR	120,000.00	120,000.00	100.00%	0.00	0.00	ERR
Indiana	819,250.35	819,250.35	100.00%	490,700.00	490,700.00	100.00%	405,600.00	405,600.00	100.00%
Iowa	780,000.00	780,000.00	100.00%	271,200.00	271,200.00	100.00%	398,400.00	398,400.00	100.00%
Kansas	101,284.90	101,284.90	100.00%	210,720.99	210,720.99	100.00%	103,100.00	103,100.00	100.00%
Kentucky	274,960.00	274,960.00	100.00%	311,140.87	177,281.00	56.98%	362,200.00	247,882.00	68.44%
Louisiana	0.00	0.00	ERR	0.00	0.00	ERR	0.00	0.00	ERR
Maine	465,000.00	465,000.00	100.00%	108,600.00	108,600.00	100.00%	432,300.00	432,300.00	100.00%
Maryland	0.00	0.00	ERR	0.00	0.00	ERR	0.00	0.00	ERR
Massachusetts	1,840,000.00	1,840,000.00	100.00%	410,800.00	410,800.00	100.00%	779,000.00	779,000.00	100.00%
Michigan	900,000.00	900,000.00	100.00%	744,000.00	744,000.00	100.00%	627,982.00	627,982.00	100.00%
Minnesota	1,062,493.27	1,062,493.27	100.00%	320,000.00	320,000.00	100.00%	642,300.00	159,107.26	24.77%
Mississippi	0.00	0.00	ERR	136,871.62	80,430.78	58.76%	0.00	0.00	ERR
Missouri	537,799.00	537,799.00	100.00%	491,000.00	491,000.00	100.00%	310,900.00	310,900.00	100.00%
Montana	207,986.00	207,986.00	100.00%	0.00	0.00	ERR	0.00	0.00	ERR
Nebraska	600,000.00	600,000.00	100.00%	150,400.00	150,400.00	100.00%	392,700.00	392,700.00	100.00%
Nevada	0.00	0.00	ERR	7,500.00	7,500.00	100.00%	0.00	0.00	ERR
New Hampshire	154,143.19	154,143.19	100.00%	21,185.22	21,185.22	100.00%	121,148.81	121,148.81	100.00%
New Jersey	400,000.00	400,000.00	100.00%	84,457.29	84,457.29	100.00%	28,353.83	25,421.56	89.66%
New Mexico	187,736.69	187,736.69	100.00%	50,784.56	42,284.41	83.26%	89,931.70	62,852.78	69.89%
New York	2,160,000.00	2,160,000.00	100.00%	1,104,600.00	1,104,600.00	100.00%	1,466,064.00	1,466,064.00	100.00%
North Carolina	135,708.54	135,708.54	100.00%	140,579.13	140,579.13	100.00%	451,600.00	451,600.00	100.00%
North Dakota	61,639.24	61,639.24	100.00%	40,600.76	40,600.76	100.00%	10,646.59	10,646.99	100.00%
Northern Mariana Is.	23,212.00	23,212.00	100.00%	0.00	0.00	0.00%	1,740.00	1,740.00	100.00%
Ohio	700,000.00	700,000.00	100.00%	945,100.00	945,100.00	100.00%	848,600.00	848,600.00	100.00%
Oklahoma	182,279.00	182,279.00	100.00%	141,546.63	141,546.63	100.00%	0.00	0.00	ERR
Oregon	560,000.00	560,000.00	100.00%	223,000.00	223,000.00	100.00%	497,900.00	497,900.00	100.00%
Pennsylvania	1,991,883.48	1,920,685.81	96.43%	1,007,214.11	1,007,214.11	100.00%	830,402.58	830,402.58	100.00%
Puerto Rico	400,000.00	400,000.00	100.00%	237,600.00	237,600.00	100.00%	86,758.00	86,758.00	100.00%
Rhode Island	330,000.00	330,000.00	100.00%	68,100.00	68,100.00	100.00%	537,853.02	537,853.02	100.00%
South Carolina	348,063.58	348,063.58	100.00%	242,399.61	242,399.61	100.00%	268,600.00	68,010.95	25.32%
South Dakota	0.00	0.00	ERR	0	0.00	ERR	0.00	0.00	ERR
Tennessee	540,000.00	540,000.00	100.00%	502,300.00	502,300.00	100.00%	713,200.00	678,460.96	95.13%
Texas	494,129.00	494,129.00	100.00%	885,782.00	885,782.00	100.00%	0.00	0.00	ERR
Utah	189,964.67	189,964.67	100.00%	97,140.82	97,140.82	100.00%	0.00	0.00	ERR
Vermont	71,175.46	71,175.46	100.00%	48,900.00	42,872.77	87.67%	0.00	0.00	ERR
Virgin Islands	0.00	0.00	ERR	0	0.00	ERR	0.00	0.00	ERR
Virginia	774,394.58	774,394.58	100.00%	381,900.00	381,900.00	100.00%	431,800.00	420,257.99	97.33%
Washington	353,849.40	353,849.40	100.00%	363,700.00	363,700.00	100.00%	278,300.00	278,300.00	100.00%
West Virginia	0.00	0.00	ERR	0.00	0.00	ERR	0.00	0.00	ERR
Wisconsin	1,500,000.00	1,500,000.00	100.00%	380,800.00	380,800.00	100.00%	928,000.00	928,000.00	100.00%
Wyoming	0.00	0.00	ERR	0	0.00	ERR	0.00	0.00	ERR
Total	24,008,595.24	23,877,303.85	99.45%	14,839,338.15	14,530,559.96	97.92%	16,803,510.52	14,830,645.43	88.26%

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Federal Solar Energy and Energy Conservation Bank State Funding

STATE	FOURTH ALLOCATION			FIFTH ALLOCATION			TOTAL ALLOCATION		
	PLAN	ACTUAL	%	PLAN	ACTUAL	%	PLAN	ACTUAL	%
Alabama	336,700.00	83,751.00	24.87%	53,400.00	0.00	0.00%	473,078.00	166,729.00	35.24%
American Somoa	46,100.00	0.00	0.00%	22,600.00	0.00	0.00%	188,700.00	120,000.00	63.59%
Arizona	251,500.00	78,037.88	31.03%	44,400.00	(.00)	.00%	459,000.62	241,138.50	52.54%
Arkansas	516,000.00	516,000.00	100.00%	106,500.00	45,412.50	42.64%	2,025,000.00	1,963,912.50	96.98%
California	657,600.00	97,229.40	14.79%	135,000.00	0.00	0.00%	4,588,000.00	3,247,741.23	70.79%
Colorado	261,700.00	35,564.08	13.59%	51,200.00	0.00	0.00%	627,557.73	281,114.68	44.80%
Connecticut	465,500.00	38,776.00	8.33%	87,300.00	0.00	0.00%	2,057,700.00	1,247,366.75	60.62%
Delaware	122,200.00	0.00	0.00%	0.00	0.00	ERR	175,700.00	10,916.00	6.21%
District of Columbia	196,100.00	4,779.44	2.44%	23,100.00	0.00	0.00%	297,413.02	82,992.46	27.90%
Florida	290,900.00	0.00	0.00%	69,900.00	0.00	0.00%	2,322,300.00	1,792,136.53	77.17%
Georgia	204,600.00	76,787.02	37.53%	48,800.00	0.00	0.00%	1,061,637.40	881,980.66	83.08%
Guam	46,500.00	0.00	0.00%	0.00	0.00	ERR	46,500.00	0.00	0.00%
Hawaii	51,500.00	2,396.10	4.65%	20,000.00	0.00	0.00%	191,500.00	85,175.00	44.48%
Idaho	469,000.00	128,983.48	27.50%	86,700.00	0.00	0.00%	1,416,400.25	989,683.73	69.87%
Illinois	942,500.00	811,043.52	86.05%	198,003.51	0.00	0.00%	3,593,303.51	3,263,843.52	90.83%
Indian Tribes	121,300.00	12,245.81	10.10%	52,200.00	0.00	0.00%	293,500.00	132,245.81	45.06%
Indiana	465,700.00	313,237.07	67.26%	116,500.00	26,308.65	22.58%	2,297,750.35	2,055,096.07	89.44%
Iowa	713,900.00	713,900.00	100.00%	137,700.00	90,870.88	65.99%	2,301,200.00	2,254,370.88	97.97%
Kansas	322,200.00	226,966.31	70.44%	84,600.00	0.00	0.00%	821,905.87	642,072.20	78.12%
Kentucky	282,100.00	227,379.00	80.60%	62,800.00	0.00	0.00%	1,293,200.87	927,502.00	71.72%
Lousiana	146,400.00	0.00	0.00%	0.00	0.00	ERR	146,400.00	0.00	0.00%
Maine	341,700.00	54,883.95	16.06%	62,800.00	0.00	0.00%	1,410,400.00	1,060,783.95	75.21%
Maryland	238,500.00	0.00	0.00%	43,400.00	0.00	0.00%	281,900.00	0.00	0.00%
Massachusetts	662,700.00	546,170.65	82.42%	138,400.00	0.00	0.00%	3,830,900.00	3,575,970.65	93.35%
Michigan	542,500.00	128,080.76	23.61%	118,700.00	0.00	0.00%	2,933,182.00	2,400,062.76	81.82%
Minnesota	451,500.00	0.00	0.00%	96,000.00	0.00	0.00%	2,572,293.27	1,541,600.53	59.93%
Mississippi	130,000.00	0.00	0.00%	0.00	0.00	ERR	266,871.62	80,430.78	30.14%
Missouri	633,600.00	633,600.00	100.00%	119,000.00	12,657.00	10.64%	2,092,299.00	1,985,956.00	94.92%
Montana	307,000.00	0.00	0.00%	0.00	0.00	ERR	514,986.00	207,986.00	40.39%
Nebraska	419,900.00	6,170.84	1.47%	75,700.00	0.00	0.00%	1,638,700.00	1,149,270.84	70.13%
Nevada	0.00	0.00	ERR	0.00	0.00	ERR	7,300.00	7,300.00	100.00%
New Hampshire	210,500.00	72,727.15	34.55%	42,300.00	0.00	0.00%	549,277.22	369,204.37	67.22%
New Jersey	322,000.00	36,616.12	11.37%	76,300.00	(.00)	.00%	911,111.12	546,494.97	59.98%
New Mexico	196,400.00	48,819.16	24.86%	47,200.00	0.00	0.00%	572,052.95	341,693.04	59.73%
New York	791,700.00	286,038.08	36.13%	163,400.00	0.00	0.00%	3,705,764.00	3,016,702.08	87.92%
North Carolina	294,200.00	294,200.00	100.00%	83,900.00	64,007.07	76.29%	1,105,987.67	1,086,094.74	98.20%
North Dakota	260,000.00	30,190.37	11.61%	48,900.00	(.00)	.00%	421,788.99	143,077.56	33.92%
Northern Mariana Is.	69,700.00	0.00	0.00%	20,000.00	0.00	0.00%	114,652.00	24,952.00	21.76%
Ohio	1,157,158.19	820,948.11	70.95%	188,300.00	0.00	0.00%	3,839,158.19	3,314,646.11	86.34%
Oklahoma	322,600.00	214,078.29	66.36%	70,700.00	0.00	0.00%	717,125.63	537,903.92	75.01%
Oregon	511,000.00	407,555.33	79.76%	88,500.00	0.00	0.00%	1,878,400.00	1,688,455.33	89.89%
Pennsylvania	796,400.00	154,573.79	19.41%	160,600.00	0.00	0.00%	4,786,500.17	3,912,876.29	81.75%
Puerto Rico	238,800.00	0.00	0.00%	25,700.00	0.00	0.00%	1,006,858.00	724,358.00	71.94%
Rhode Island	455,300.00	137,246.34	30.14%	81,800.00	0.00	0.00%	1,473,053.02	1,073,199.36	72.86%
South Carolina	323,900.00	.00	.00%	67,000.00	0.00	0.00%	1,249,963.19	658,474.14	52.68%
South Dakota	131,500.00	5,000.00	3.80%	0.00	0.00	ERR	131,500.00	5,000.00	3.80%
Tennessee	420,100.00	0.00	0.00%	108,500.00	0.00	0.00%	2,284,100.00	1,720,760.96	75.34%
Texas	342,200.00	194,000.00	56.69%	90,100.00	0.00	0.00%	1,812,211.00	1,573,911.00	86.85%
Utah	387,000.00	350,742.75	90.63%	90,800.00	35,791.61	39.42%	764,905.49	673,639.85	88.07%
Vermont	211,300.00	17,169.47	8.13%	55,900.00	0.00	0.00%	387,275.46	131,217.70	33.88%
Virgin Islands	120,000.00	36,000.00	30.00%	0.00	0.00	ERR	120,000.00	36,000.00	30.00%
Virginia	392,900.00	36,492.71	9.29%	91,200.00	0.00	0.00%	2,072,194.58	1,613,045.28	77.84%
Washington	398,400.00	315,250.60	79.13%	73,100.00	0.00	0.00%	1,467,349.40	1,311,100.00	89.35%
West Virginia	137,300.00	0.00	0.00%	0.00	0.00	ERR	137,300.00	0.00	0.00%
Wisconsin	850,500.00	651,772.00	76.63%	145,000.00	0.00	0.00%	3,804,300.00	3,460,572.00	90.96%
Wyoming	120,000.00	0.00	0.00%	0.00	0.00	ERR	120,000.00	0.00	0.00%
Total	20,116,258.19	8,845,400.58	43.97%	3,891,903.51	275,047 71	7.07%	79,659,605.61	62,358,957.53	78.28%

Table II-1B.
Low Income Conservation Expenditures
By State, Region and Source FY1985
For NASCSP Survey States

FEDERAL REGION	STATE	TOT.FEDL $	TOT.STATE $	TOT PVT $	TOTAL	EST. CUMLTV. TOTAL EXPENDTR. FY1978-1985 2/
	1985 TOTALS	$359,130,403	$37,930,000	$75,156,555	$472,666,958	$1,949,876,631
	CONNECTICUT	$2,504,662	$3,230,000	$40,000	$5,774,662	$29,936,091
	MAINE	$2,972,113	$0	$0	$2,972,113	$28,895,787
	MASSACHUSETTS	$26,401,073	$25,500,000	$6,140,000	$60,041,073	$143,978,788
I	NEW HAMPSHIRE	$3,047,457	$0	$20,000	$3,067,457	$12,448,621
	RHODE ISLAND	$1,862,637	$0	$0	$1,862,637	$11,344,661
	VERMONT	$3,128,020	$0	$0	$3,128,020	$19,049,774
	total	$41,915,962	$28,730,000	$6,200,000	$76,845,962	$245,653,722
	NEW YORK	$38,550,000	$0	$0	$38,580,000	$196,077,298
	total	$38,550,000	$0	$0	$38,580,000	$196,077,298
	DELAWARE	$1,243,349	$0	$0	$1,243,349	$4,783,531
	PENNSYLVANIA	$20,249,449	$0	$7,000,000	$27,249,449	$99,386,565
III	WEST VIRGINIA	$4,971,041	$0	$0	$4,971,041	$29,133,973
	total	$26,463,839	$0	$7,000,000	$33,463,839	$133,304,069
	ALABAMA	$4,429,032	$0	$0	$4,429,032	$23,117,995
	GEORGIA	$4,416,119	$0	$0	$4,416,119	$22,964,154
	KENTUCKY	$8,096,398	$0	$25,000	$8,121,398	$41,419,153
IV	MISSISSIPPI	$3,440,002	$0	$0	$3,440,002	$15,442,414
	NO. CAROLINA	$5,553,064	$0	$0	$5,553,064	$28,549 931
	SO. CAROLINA	$3,327,846	$0	$0	$3,327,846	$15,861,381
	TENNESSEE	$8,752,530	$0	$176,055	$8,928,585	$37,176,443
	total	$38,014,991	$0	$201,055	$38,216,046	$184,531,471
	1/ ILLINOIS	$29,163,013	$0	$132,500	$29,715,513	$111,332,202
	INDIANA	$14,490,404	$0	$0	$14,490,404	$84,299,923
	MICHIGAN	$17,645,000	$3,000,000	$0	$20,645,000	$121,025,000
V	MINNESOTA	$18,555,441	$1,000,000	$5,200,000	$24,755,441	$130,018,171
	OHIO	$27,462,047	$0	$0	$27,462,047	$142,315,378
	WISCONSIN	$18,156,315	$0	$7,500,000	$25,656,315	$93,275,443
	total	$125,472,220	$4,000,000	$12,832,500	$142,724,720	$682,266,117
	ARKANSAS	$1,623,482	$0	$0	$1,623,482	$15,890,000
	LOUISIANA	$2,989,609	$0	$0	$2,989,609	$10,244,502
VI	OKLAHOMA	$4,860,556	$0	$0	$4,860,556	$25,399,679
	TEXAS	$14,861,888	$0	$0	$14,861,888	$43,084,092
	total	$24,335,535	$0	$0	$24,335,535	$94,618,273

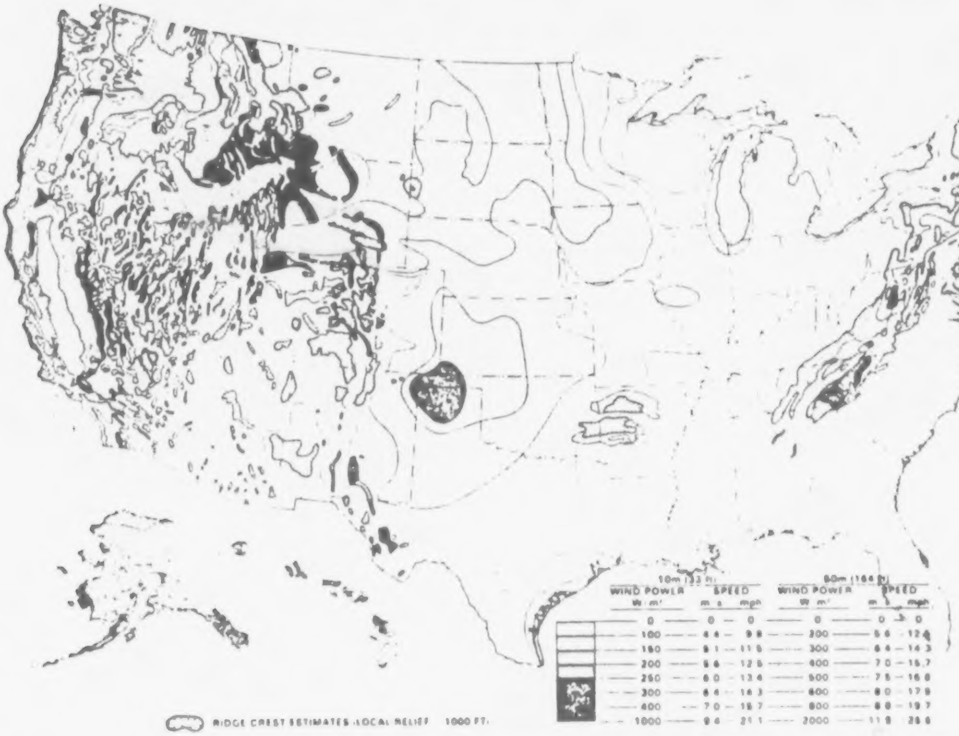
Table D-1
Federal Low-Income Conservation Programs
FY1978 - FY1985
(Continued)
DOE/WAP

	OWNER/OCC			RENTER/DETACHED			RENTER/MULTI-FAMILY			MOBILE		
	THRU 83	FY84	FY85	THRU 83	FY84	FY85	THRU 83	FY84	FY85	THRU 83	FY84	FY85
ALABAMA	14118	1348	800	436	90	89			50	297	360	235
ALASKA	2267	564	708	406	121	145	233	91	200			
ARIZONA	6300	1000	1000	700	100	100						
ARKANSAS	12116	3079	2058	686	597	280	31	30	84			
CALIFORNIA	13220	1809	2889	3156	2016	2024	807	2198	866			
CONNECTICUT	3264	1201	511	1069	416	355	3249	818	439		10	
DELAWARE	1961	384	326	671	138	100	70		11			
GEORGIA	8243	1535	1472	1667	196	224	146	43	29			
HAWAII	1581	373	269	1365	621	449	1221	554	402			
IDAHO	8896	1263	1392	2698	1280	714			87			
ILLINOIS	24352	3931	3671	3401	1155	1833	7854	2896	610			
INDIANA	35845	3836	2134	8924	1241	847	675	229	42			
IOWA		3188	1641		1686	549		365	549			
KANSAS	11061	1917	994	3100	541	280	1573	273	142			
KENTUCKY	15896	2414	1975	1949	75	105	39			10000	900	850
LOUISIANA	2126	506	506	397	95	95	284	67	67	28	7	7
MAINE	12696	1552	1167	1547	396	226	686	407	185			
MASSACHUSETTS	12959	1587	1774	12104	293	138		2505	2030			
MICHIGAN	51890	9656	6154	4438	2699	1197	4438	1817	1762			
MINNESOTA	36960	3872	2805	11248	3169	2806						
MISSISSIPPI		1092	1025		58	65		1			127	120
MISSOURI	36113	4740	2557	3047	805	1077	111	36	145			
MONTANA	6768			2547			332					
NEBRASKA	8904	1774	1207	2631	558	346	560	79	167			
NEW HAMPSHIRE	4463	729		1110			974	339				
NEW JERSEY	7828			3489			14307					
NEW MEXICO												
NEW YORK	36030	5421	8268	24771	3727	5685	24771	3727	5685	4504	678	1033
NO. CAROLINA	17676	2625	1271	1425	748	402	125	21				
NO. DAKOTA	6959	1237	1000	1540	560	450	532	146	130			
OHIO	24506	7091	7311	5178	2593	2345	9792	4005	4138			
OKLAHOMA	14351	1786	1707	989	240	158	12	6	30			
OREGON	8467	1701	351	1867	621	155	833	226	89			
PENNSYLVANIA	39197	7676	6469	19220	5238	2300			256			
RHODE ISLAND	7942	701		3738	767		1484	101		1025	43	
SO. CAROLINA	4793	227	320	774	446	206	207	1	5			100
TENNESSEE	14337	2039	4123	956	352	867	236	13	101			541
TEXAS												
UTAH		993	583		520	218		72	96			
VERMONT	4575	572	474	1988	205	171	1910	249	152	2288	261	202
VIRGINIA		1860			563			24				
WASHINGTON	10909	1613	1356	2275	662	651	533	270	148			
WEST VIRGINIA	21108	1391	1216	6528	436	373	746	74	33			
WISCONSIN		4090	4037		1606	1766		1036	1473			
WYOMING	2121	581		471	167		63	31				
TOTAL STATES	38	41	37	38	40	37	32	34	32	6	8	8
TOTAL	552798	94954	77521	144506	37797	29791	78834	22750	20203	18142	2386	3088

SETTLEMENT
EXHIBIT H

CALCULATION OF RATIOS FOR DISTRIBUTION TO STATES AND TERRITORIES — M.D.L. 378

State	Consumption	Ratio
Alabama	626,803,520	0.01534512450
Alaska	158,047,980	0.00386926023
American Samoa	7,275,000	0.00017810331
Arizona	418,994,930	0.01025764719
Arkansas	519,811,670	0.01272579770
California	3,739,318,300	0.09154432453
Colorado	439,201,380	0.01075233249
Connecticut	693,689,220	0.01698259040
Delaware	193,932,730	0.00474777469
District of Columbia	97,574,660	0.00238877935
Florida	1,887,260,600	0.04620307312
Georgia	909,619,880	0.02226890861
Guam	60,196,000	0.00147369165
Hawaii	280,655,260	0.00687087703
Idaho	167,643,790	0.00410418057
Illinois	1,876,159,080	0.04593129065
Indiana	1,006,156,560	0.02463227660
Iowa	532,229,530	0.01302980621
Kansas	457,905,310	0.01121023378
Kentucky	523,601,010	0.01281856663
Louisiana	971,591,210	0.02378606310
Maine	300,279,730	0.00735131456
Maryland	731,363,020	0.01790490359
Massachusetts	1,398,309,100	0.03423278036
Michigan	1,391,772,090	0.03407274419
Minnesota	708,814,590	0.01735288297
Mississippi	557,786,510	0.01365548081
Missouri	806,514,320	0.01974472423
Montana	184,882,510	0.00452621123
Nebraska	301,217,700	0.00737427752
Nevada	165,454,200	0.00405057600
New Hampshire	190,375,330	0.00466068401
New Jersey	1,507,862,710	0.03691482302
New Mexico	267,574,460	0.00655063871
New York	3,162,994,520	0.07743502253
No. Mariana Islands	3,763,000	0.00009212409
North Carolina	916,800,700	0.02244470625
North Dakota	149,717,090	0.00366530709
Ohio	1,534,904,170	0.03757684000
Oklahoma	504,488,400	0.01235066023
Oregon	404,894,790	0.00991245384
Pennsylvania	1,901,863,900	0.04656058461
Puerto Rico	389,132,000	0.00952655624
Rhode Island	161,953,570	0.00396487514
South Carolina	486,978,850	0.01192199923
South Dakota	146,053,670	0.00357562087
Tennessee	660,920,850	0.01618036977
Texas	3,013,545,120	0.07377626891
Utah	240,978,330	0.00589952410
Vermont	97,762,860	0.00239338678
Virgin Islands	188,953,000	0.00462586316
Virginia	1,048,324,650	0.02566461699
Washington	623,786,920	0.01527127344
West Virginia	244,121,480	0.00597647330
Wisconsin	718,698,070	0.01759484593
Wyoming	166,569,650	0.00407788395
Totals	40,847,079,480	1.00000000000

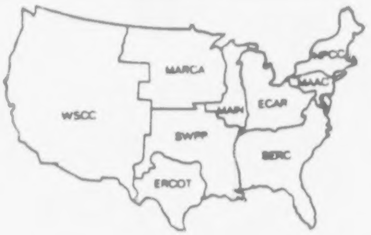

10m (33 ft)
WIND POWER W/m²
SPEED m/s mph
50m (164 ft)
WIND POWER W/m²
SPEED m/s mph
0 — 0 — 0 — 0 — 0 — 0
100 — 4.4 — 9.8 — 200 — 5.6 — 12.5
150 — 5.1 — 11.5 — 300 — 6.4 — 14.3
200 — 5.6 — 12.5 — 400 — 7.0 — 15.7
250 — 6.0 — 13.4 — 500 — 7.5 — 16.8
300 — 6.4 — 14.3 — 600 — 8.0 — 17.9
400 — 7.0 — 15.7 — 800 — 8.8 — 19.7
1000 — 9.4 — 21.1 — 2000 — 11.9 — 26.6
RIDGE CREST ESTIMATES (LOCAL RELIEF > 1000 FT)

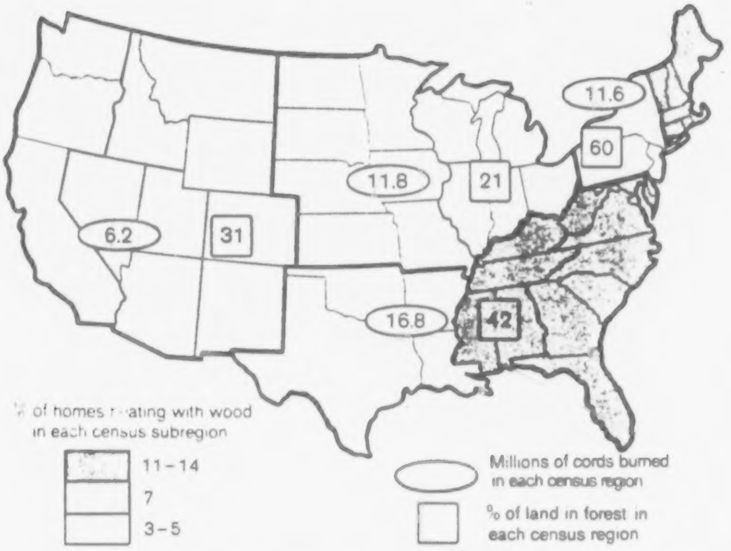
U.S. ANNUAL AVERAGE WIND POWER (Pacific Northwest Laboratory-1980)

MOST PROMISING HYDROPOTENTIAL IN EACH U.S. ELECTRICITY POWER POOL REGION

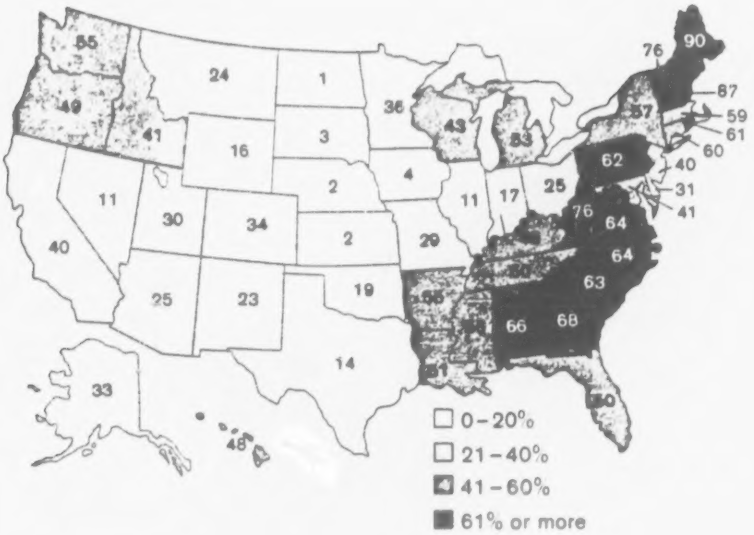
Region	Sites with dams		Annual	Undeveloped sites		Annual
	Number	Capacity	output	Number	Capacity	output
WSCC	315	8,730	16,416	204	11,682	33,392
ECAR	178	2,900	10,620	16	1,540	2,540
NPCC	553	2,432	8,367	102	2,394	8,336
SWPP	62	1,027	3,602	40	1,217	3,747
MAIN	58	1,244	3,483	0	0	0
SERC	100	1,513	2,416	83	5,234	11,103
MARCA	46	1,022	1,573	2	24	81
MAAC	46	465	1,024	1	424	521
ERCOT	19	137	292	33	466	950
Alaska	10	17	162	49	3,510	15,380
Hawaii	7	9	28	7	29	84
Total	1,394	19,496	47,983	537	26,520	76,134

Note: Capacity is in megawatts, output is in millions of kilowatt hours per year. Mutually exclusive competing projects are not double counted. MAIN values are estimates.
Source: U.S. Army Corps of Engineers 1983.

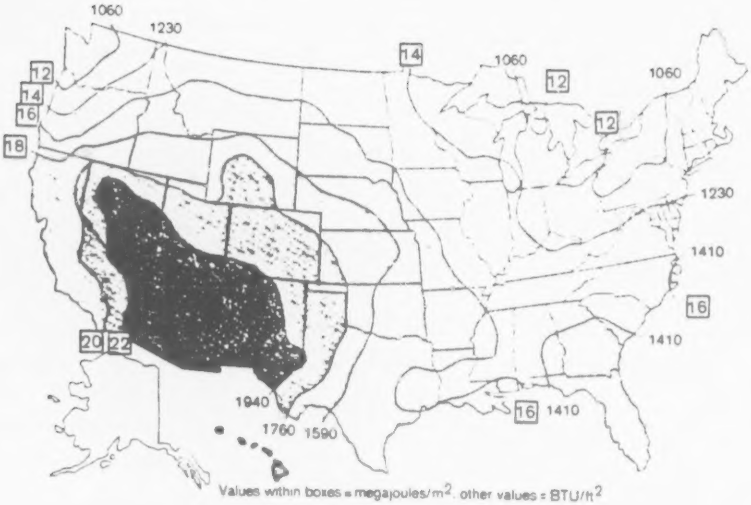

WSCC
MARCA
NPCC
MAAC
MAIN
ECAR
SWPP
SERC
ERCOT


11.6
60
11.8
21
6.2
31
16.8
42
% of homes heating with wood in each census subregion
11–14
7
3–5
Millions of cords burned in each census region
% of land in forest in each census region

REGIONAL USE OF WOOD FOR RESIDENTIAL HEATING (US DOE 1984


55
49
41
24
1
3
16
36
43
53
76
90
87
57
59
61
60
62
40
31
41
2
4
11
17
25
11
30
34
2
29
76
64
64
40
63
25
23
19
66
68
14
51
50
33
48
☐ 0–20%
☐ 21–40%
▨ 41–60%
■ 61% or more

PERCENT OF LAND IN FOREST (US Forest Service 1982)


1060
1230
12
14
16
18
14
1060
12
1060
12
1230
1410
16
1410
20
22
1940
1760
1590
16
1410

Values within boxes = megajoules/m^2, other values = BTU/ft^2

SOLAR ENERGY. Annual average insolation on a south facing surface with tilt = latitude + 15° (Solar Energy Research Institute 1981b)

NATIONWIDE RANKINGS BASED UPON 500 KWH CONSUMPTION PER MONTH

COMPANY	CITY	STATE	TOTAL BILL*	AVG.COST CENTS/KWH	RANK
ALABAMA POWER COMPANY	BIRMINGHAM	ALABAMA	$122.40	8.16	96
ALASKA ELECTRIC LIGHT & POWER CO.	JUNEA	ALASKA	$114.73	7.65	120
ARIZONA PUBLIC SERVICE CO.	PHOENIX	ARIZONA	$144.39	9.63	43
CITIZENS UTILITYES CO.	KINGMAN	ARIZONA	$143.58	9.57	47
TUSCON ELECTRIC POWER CO.	TUCSON	ARIZONA	$112.74	7.52	127
ARKANSAS POWER & LIGHT CO.	LITTLE ROCK	ARKANSAS	$144.67	9.64	42
EMPIRE DISTRICT ELECTRIC CO.	GRAVETTE	ARKANSAS	$90.77	6.05	177
OKLAHOMA GAS & ELECTRIC CO.	FORT SMITH	ARKANSAS	$139.93	9.33	54
SOUTHWESTERN ELECTRIC POWER CO.	FAYETTEVILLE	ARKANSAS	$124.11	8.27	92
PACIFIC GAS & ELECTRIC CO.	SAN FRANCISCO	CALIFORNIA	$118.17	7.88	109
SAN DIEGO GAS & ELECTRIC CO.	SAN DIEGO	CALIFORNIA	$195.00	13.00	7
SIERRA PACIFIC POWER CO.	S.LAKE TAHOE	CALIFORNIA	$130.33	8.69	67
SOUTHERN CALIFORNIA EDISON CO.	LONG BEACH	CALIFORNIA	$101.61	6.77	153
HOME LIGHT & POWER CO.	GREELEY	COLORADO	$104.08	6.94	149
PUBLIC SERVICE CO. OF COLORADO	DENVER	COLORADO	$103.17	6.88	150
SOUTHERN COLORADO POWER CO.	PUEBLO	COLORADO	$113.31	7.55	124
CONNECTICUT LIGHT & POWER CO.	HARTFORD	CONNECTICUT	$152.68	10.18	30
THE UNITED ILLUMINATING CO.	BRIDGEPORT	CONNECTICUT	$175.54	11.70	12
DELMARVA POWER & LIGHT CO.	WILMINGTON	DELAWARE	$161.52	10.77	23
POTOMAC ELECTRIC POWER CO.	WASHINGTON	DIST. OF COL.	$107.98	7.20	139
FLORIDA POWER & LIGHT CO.	MIAMI	FLORIDA	$128.37	8.56	73
FLORIDA POWER CORP.	ST. PETERSBURG	FLORIDA	$130.05	8.67	68
GULF POWER CO.	PENSACOLA	FLORIDA	$114.39	7.63	122
TAMPA ELECTRIC CO.	TAMPA	FLORIDA	$125.94	8.40	83
GEORGIA POWER CO.	ATLANTA	GEORGIA	$97.41	6.49	164
SAVANNAH ELECTRIC & POWER CO	SAVANNAH	GEORGIA	$122.85	8.19	95
HAWAII ELECTRIC LIGHT CO.	HILO	HAWAII	$200.62	13.37	6
HAWAIIAN ELECTRIC CO.	HONOLULU	HAWAII	$154.95	10.33	28
MAUI ELECTRIC CO.	KAHULUI	HAWAII	$211.78	14.12	2
IDAHO POWER CO.	BOISE	IDAHO	$62.19	4.15	194
UTAH POWER & LIGHT COMPANY	REXBURG	IDAHO	$104.49	6.97	147
WASHINGTON WATER POWER CO.	LEWISTON	IDAHO	$54.30	3.62	199
CENTRAL ILLINOIS LIGHT CO	PEORIA	ILLINOIS	$141.63	9.44	51
CENTRAL ILLINOIS PUBLIC SERVICE CO.	QUINCY	ILLINOIS	$147.09	9.81	37
COMMONWEALTH EDISON CO	CHICAGO	ILLINOIS	$176.20	11.75	11
ILLINOIS POWER CO.	DECATUR	ILLINOIS	$120.90	8.06	103
INTERSTATE POWER CO.	SAVANNA	ILLINOIS	$119.58	7.97	107
IOWA-ILLINOIS GAS & ELEC. CO.	ROCK ISLAND	ILLINOIS	$162.55	10.84	21
MT.CARMEL PUBLIC UTILITY CO.	MOUNT CARMEL	ILLINOIS	$121.26	8.08	100
SHERRARD POWER SYSTEM	SHERRARD	ILLINOIS	$172.88	11.53	14
SO.BELOIT WATER,GAS & ELEC CO.	SO. BELOIT	ILLINOIS	$92.42	6.16	172
UNION ELECTRIC CO.	EAST ST. LOUIS	ILLINOIS	$139.24	9.28	55
INDIANA & MICHIGAN ELEC. CO.	FORT WAYNE	INDIANA	$110.91	7.39	132
INDIANAPOLIS POWER & LT. CO.	INDIANAPOLIS	INDIANA	$96.06	6.40	165
NORTHERN INDIANA PUB. SERVICE	GARY	INDIANA	$168.63	11.24	18
PUBLIC SERVICE CO. OF INDIANA.INC	TERRE HAUTE	INDIANA	$127.91	8.53	75
SO.INDIANA GAS & ELEC. CO	EVANSVILLE	INDIANA	$94.93	6.33	166
INTERSTATE POWER CO.	DUBUQUE	IOWA	$109.72	7.31	134
IOWA ELEC. LT. & POWER CO.	CEDAR RAPIDS	IOWA	$141.34	9.42	52
IOWA POWER & LIGHT	DES MOINES	IOWA	$147.42	9.83	36
IOWA PUBLIC SERVICE CO.	SIOUX CITY	IOWA	$137.89	9.19	57
IOWA SOUTHERN UTILITIES	CENTERVILLE	IOWA	$105.40	7.03	143
IOWA-ILLINOIS GAS & ELEC. CO.	QUAD CITIES	IOWA	$155.07	10.34	27

NATIONWIDE RANKINGS BASED UPON 500 KWH CONSUMPTION PER MONTH

COMPANY	CITY	STATE	TOTAL BILL*	AVG.COST CENTS/KWH	RANK
CENTRAL TELEPHONE & UTILITIES CORP.	DODGE CITY	KANSAS	$147.03	9.80	38
EMPIRE DISTRICT ELEC. CO.	BAXTER SPRINGS	KANSAS	$93.59	6.24	169
KANSAS CITY POWER & LT.CO.	OVERLAND PARK	KANSAS	$129.01	8.60	71
KANSAS GAS & ELEC. CO	WICHITA	KANSAS	$114.70	7.65	121
KANSAS POWER & LIGHT CO.	TOPEKA	KANSAS	$119.25	7.95	108
KENTUCKY POWER CO.	ASHLAND	KENTUCKY	$91.54	6.10	174
KENTUCKY UTILITIES CO.	LEXINGTON	KENTUCKY	$87.94	5.86	179
LOUISVILLE GAS & ELEC CO.	LOUISVILLE	KENTUCKY	$109.15	7.28	137
UNION LT. HEAT & POWER CO.	COVINGTON	KENTUCKY	$98.43	6.56	161
CENTRAL LOUISIANA ELEC. CO.	SLIDELL	LOUISIANA	$121.22	8.08	101
GULF STATES UTILITIES	BATON ROUGE	LOUISIANA	$124.69	8.31	89
LOUISIANA POWER & LT.	JEFF.PARISH	LOUISIANA	$86.68	5.78	181
SOUTHWESTERN ELEC. POWER CO.	SHREVPORT	LOUISIANA	$116.30	7.75	111
BANGOR HYDRO-ELECTRIC CO.	BANGOR	MAINE	$125.28	8.35	84
CENTRAL MAINE POWER CO.	PORTLAND	MAINE	$123.81	8.25	93
MAINE PUBLIC SERVICE CO.	PRESQUE ISLE	MAINE	$135.45	9.03	62
BALTIMORE GAS & ELECTRIC	BALTIMORE	MARYLAND	$124.88	8.33	88
CONOWINGO POWER COMPANY	ELKTON	MARYLAND	$158.35	10.56	24
DELMARVA POWER & LIGHT	SALISBURY	MARYLAND	$143.67	9.58	46
POTOMAC EDISON COMPANY	FREDERICK	MARYLAND	$94.49	6.30	167
POTOMAC ELECTRIC POWER CO.	MONTGOMERY CO.	MARYLAND	$111.88	7.46	129
BOSTON EDISON	BOSTON	MASSACHUSETTS	$161.94	10.80	22
CAMBRIDGE ELECTRIC LIGHT CO.	CAMBRIDGE	MASSACHUSETTS	$114.06	7.60	123
COMMONWEALTH ELECTRIC CO.	NEW BEDFORD	MASSACHUSETTS	$146.50	9.77	39
EASTERN EDISON COMPANY	FALL RIVER	MASSACHUSETTS	$142.26	9.48	50
FITCHBURG GAS & ELECTRIC LIGHT CO.	FITCHBURG	MASSACHUSETTS	$163.29	10.89	20
MASSACHUSETTS ELECTRIC CO.	WORCESTER	MASSACHUSETTS	$110.67	7.38	133
NANTUCKET ELECTRIC COMPANY	NANTUCKET	MASSACHUSETTS	$204.65	13.64	4
WESTERN MASS. ELECTRIC CO.	SPRINGFIELD	MASSACHUSETTS	$143.51	9.57	48
CONSUMERS POWER	FLINT	MICHIGAN	$80.58	5.37	184
DETROIT EDISON	DETROIT	MICHIGAN	$114.97	7.66	119
INTERSTATE POWER CO.	ALBERT LEA	MINNESOTA	$124.19	8.28	90
MINNESOTA POWER & LIGHT CO.	DULUTH	MINNESOTA	$81.09	5.41	183
NORTHERN STATES POWER	MINNEAPOLIS	MINNESOTA	$101.04	6.74	155
OTTERTAIL POWER CO.	FERGUS FALLS	MINNESOTA	$125.09	8.34	86
MISSISSIPPI POWER & LIGHT CO.	JACKSON	MISSISSIPPI	$120.92	8.06	102
MISSISSIPPI POWER CO.	GULFPORT	MISSISSIPPI	$97.44	6.50	163
ARKANSAS POWER & LIGHT CO.	CARUTHERSVILLE	MISSOURI	$143.76	9.58	45
EMPIRE DISTRIC CO.	JOPLIN	MISSOURI	$104.67	6.98	145
KANSAS CITY POWER & LIGHT CO.	KANSAS CITY	MISSOURI	$123.60	8.24	94
MISSOURI PUBLIC SERVICE CO.	RAYTOWN	MISSOURI	$137.64	9.18	59
ST.JOSEPH LIGHT & POWER CO.	ST.JOESPH	MISSOURI	$115.98	7.73	112
UNION ELECTRIC COMPANY	ST. LOUIS	MISSOURI	$126.54	8.44	78
MONTANA POWER CO.	BILLINGS	MONTANA	$61.40	4.09	195
MONTANA-DAKOTA UTILITIES CO.	GLENDIVE	MONTANA	$107.50	7.17	140
PACIFIC POWER AND LIGHT CO.	KALISPELL	MONTANA	$72.02	4.80	190
NEVADA POWER	LAS VEGAS	NEVADA	$94.41	6.29	168
SIERRA PACIFIC POWER CO.	RENO	NEVADA	$128.10	8.54	74
CONCORD ELECTRIC CO.	CONCORD	NEW HAMPSHIRE	$119.61	7.97	106
CONNECTICUT VALLEY ELECTRIC CO. INC.	CLAREMONT	NEW HAMPSHIRE	$137.67	9.18	58
EXETER & HAMPTON ELECTRIC CO.	EXETER	NEW HAMPSHIRE	$115.69	7.71	114
GRANITE STATE ELEC. CO.	SALEM	NEW HAMPSHIRE	$125.19	8.35	85
N.H. ELECTRIC COOPERATIVE, INC.	PLYMOUTH	NEW HAMPSHIRE	$115.23	7.68	118

NATIONWIDE RANKINGS BASED UPON 500 KWH CONSUMPTION PER MONTH

COMPANY	CITY	STATE	TOTAL BILL*	AVG.COST CENTS/KWH	RANK
PUBLIC SERVICE CO. OF N.H.	MANCHESTER	NEW HAMPSHIRE	$143.88	9.59	44
ATLANTIC ELECTRIC CO.	BRIDGETON	NEW JERSEY	$172.47	11.50	15
JERSEY CENTRAL POWER & LIGHT CO.	DOVER	NEW JERSEY	$179.13	11.94	10
PUBLIC SERVICE ELEC. & GAS CO.	NEWARK	NEW JERSEY	$171.86	11.46	16
ROCKLAND ELEC. CO.	RAMSEY	NEW JERSEY	$183.15	12.21	9
EL PASO ELEC. CO.	LAS CRUCES	NEW MEXICO	$157.88	10.53	26
PUBLIC SERVICE CO. OF NEW MEXICO	ALBURQUERQUE	NEW MEXICO	$142.29	9.49	49
SOUTHWESTERN PUBLIC SERVICE CO.	ROSWELL	NEW MEXICO	$109.44	7.30	136
TEXAS-NEW MEXICO POWER CO.	ALAMOGORDO	NEW MEXICO	$136.92	9.13	61
CENTRAL HUDSON GASD & ELEC. CORP.	POUGHKEEPSIE	NEW YORK	$184.95	12.33	8
CONSOLIDATED EDISON CO. OF N.Y.	NEW YORK	NEW YORK	$231.95	15.46	1
LONG ISLAND LIGHTING CO.	LONG BEACH	NEW YORK	$205.56	13.70	3
NEW YORK STATE ELEC. & GAS CORP.	BINGHAMTON	NEW YORK	$144.97	9.66	41
NIAGARA MOHAWK POWER CO.	BUFFALO	NEW YORK	$113.28	7.55	125
ORANGE & ROCKLAND UTILITIES, INC.	MIDDLETOWN	NEW YORK	$202.59	13.51	5
ROCHESTER GAS & ELEC. CORP.	ROCHESTER	NEW YORK	$128.58	8.57	72
CAROLINA POWER & LIGHT CO.	RALEIGH	NORTH CAROLINA	$121.46	8.10	99
DUKE POWER CO.	CHARLOTTE	NORTH CAROLINA	$105.90	7.06	142
NANTAHALA POWER & LIGHT CO.	FRANKLIN	NORTH CAROLINA	$100.58	6.71	157
NORTH CAROLINA POWER	ROANOKE R.	NORTH CAROLINA	$132.12	8.81	65
MONTANA-DAKOTA UTILITIES CO.	BISMARCK	NORTH DAKOTA	$106.02	7.07	141
NORTHERN STATES POWER CO.	FARGO	NORTH DAKOTA	$93.31	6.22	170
OTTER TAIL POWER CO.	JAMESTOWN	NORTH DAKOTA	$126.46	8.43	79
CININNATI GAS & ELECTRIC	CINCINNATI	OHIO	$113.25	7.55	126
CLEVELAND ELEC. ILLUMINATING	CLEVELAND	OHIO	$158.04	10.54	25
COLUMBUS & SOUTHERN OHIO ELEC.	COLUMBUS	OHIO	$122.13	8.14	97
DAYTON POWER & LIGHT	DAYTON	OHIO	$131.89	8.79	66
MONOGAHELA POWER CO.	MARIETTA	OHIO	$79.92	5.33	185
OHIO EDISON	AKRON	OHIO	$149.19	9.95	34
OHIO POWER	CANTON	OHIO	$108.30	7.22	138
TOLEDO EDISON	TOLEDO	OHIO	$154.23	10.28	29
OKLAHOMA GAS & ELECTRIC CO.	OKLAHOMA CITY	OKLAHOMA	$111.66	7.44	130
PUBLIC SERVICE CO. OF OKLAHOMA	TULSA	OKLAHOMA	$112.19	7.48	128
CP NATIONAL CORP.	LA GRANDE	OREGON	$66.19	4.41	193
IDAHO POWER CO.	ONTARIO	OREGON	$57.78	3.85	197
PACIFIC POWER & LIGHT CO.	PORTLAND	OREGON	$72.44	4.83	189
PORTLAND GENERAL ELEC. CO.	PORTLAND	OREGON	$70.19	4.68	192
DUQUNSE LIGHT CO.	PITTSBURG	PENNSYLVANIA	$151.47	10.10	32
METROPOLITIAN EDISION CO.	READING	PENNSYLVANIA	$137.43	9.16	60
PENNSYLVANIA ELECTRIC CO.	EIRE	PENNSYLVANIA	$124.17	8.28	91
PENNSYLVANIA POWER & LIGHT	ALLENTOWN	PENNSYLVANIA	$129.99	8.67	69
PENNSYLVANIA POWER CO.	NEW CASTLE	PENNSYLVANIA	$145.98	9.73	40
PHILADELPHIA ELECTRIC CO.	PHILADELPHIA	PENNSYLVANIA	$175.05	11.67	13
WEST PENN POWER CO.	WASHINGTON	PENNSYLVANIA	$81.39	5.43	182
BLACKSTONE VALLEY ELECTRIC CO.	PAUTUCKET	RHODE ISLAND	$151.98	10.13	31
NARRAGANSETT ELECTRIC COMPANY	PROVIDENCE	RHODE ISLAND	$134.41	8.96	64
NEWPORT ELECTRIC COMPANY	NEWPORT	RHODE ISLAND	$149.97	10.00	33
CAROLINA POWER & LIGHT CO.	FLORENCE	SOUTH CAROLINA	$121.68	8.11	98
DUKE POWER CO.	GREENVILLE	SOUTH CAROLINA	$98.85	6.59	159
LOCKHART POWER CO.	JONESVILLE	SOUTH CAROLINA	$104.76	6.98	144
SOUTH CAROLINA ELEC. & GAS CO.	COLUMBIA	SOUTH CAROLINA	$125.94	8.40	82
BLACK HILLS POWER & LIGHT CO.	RAPID CITY	SOUTH DAKOTA	$117.97	7.86	110
NORTHERN STATES POWER CO.	SIOUX FALLS	SOUTH DAKOTA	$104.65	6.98	146

NATIONWIDE RANKINGS BASED UPON 500 KWH CONSUMPTION PER MONTH

COMPANY	CITY	STATE	TOTAL BILL*	AVG.COST CENTS/KWH	RANK
NORTHWESTERN PUBLIC SERVICE CO.	ABERDEEN	SOUTH DAKOTA	$141.05	9.40	53
KINGSPORT POWER COMPANY	KINGSPORT	TENNESSEE	$86.77	5.78	180
CENTRAL POWER & LIGHT CO.	CORPUS CHRISTI	TEXAS	$115.32	7.69	117
EL PASO ELECTRIC CO.	EL PASO	TEXAS	$148.89	9.93	35
GULF STATES UTILITIES CO.	BEAUMONT	TEXAS	$169.50	11.30	17
HOUSTON LIGHTING & POWER CO.	HOUSTON	TEXAS	$127.08	8.47	76
SOUTHWESTERN ELECTRIC POWER CO.	LONGVIEW	TEXAS	$126.26	8.42	80
SOUTHWESTERN ELECTRIC SERVICE CO.	JACKSONVILLE	TEXAS	$120.50	8.03	104
SOUTHWESTERN PUBLIC SERVICE CO.	AMARILLO	TEXAS	$119.88	7.99	105
TEXAS UTILITIES ELECTRIC CO.	DALLAS	TEXAS	$125.08	8.34	87
TEXAS-NEW MEXICO POWER CO.	TEXAS CITY	TEXAS	$135.13	9.01	63
WEST TEXAS UTILITIES CO.	ABILENE	TEXAS	$138.96	9.26	56
UTAH POWER & LIGHT CO.	SALT LAKE CITY	UTAH	$129.50	8.63	70
CENTRAL VERMONT PUBLIC SERVICE CORP.	RUTLAND	VERMONT	$91.50	6.10	175
CITIZENS UTILITIES	NEWPORT	VERMONT	$78.21	5.21	186
GREEN MOUNTAIN POWER CORP.	BURLINGTON	VERMONT	$89.64	5.98	178
APPALACHIAN POWER CO.	ROANOAK	VIRGINIA	$98.10	6.54	162
DELMARVA POWER & LIGHT CO.	EXMORE	VIRGINIA	$168.54	11.24	19
OLD DOMINION POWER CO.	NORTON	VIRGINIA	$100.74	6.72	156
POTOMAC ELECTRIC POWER CO.	ARLINGTON	VIRGINIA	$125.97	8.40	81
THE POTOMAC EDISON CO.	WINCHESTER	VIRGINIA	$98.70	6.58	160
VIRGINIA ELECTRIC & POWER CO.	NORFOLK	VIRGINIA	$115.53	7.70	115
PACIFIC POWER & LIGHT	YAKIMA	WASHINGTON	$60.04	4.00	196
PUGET SOUND POWER & LIGHT CO.	BELLEVUE	WASHINGTON	$71.40	4.76	191
WASHINGTON WATER POWER CO.	SPOKANE	WASHINGTON	$55.20	3.68	198
APPALACHIAN POWER CO.	CHARLESTON	WEST VIRGINIA	$102.93	6.86	151
MONOGAHELA POWER CO.	PARKERSBURG	WEST VIRGINIA	$90.99	6.07	176
POTOMAC EDISON CO.	MARTINSBURG	WEST VIRGINIA	$99.58	6.64	158
VIRGINIA ELECTRIC & POWER CO.	HINTON	WEST VIRGINIA	$111.49	7.43	131
WHEELING ELECTRIC CO.	WHEELING	WEST VIRGINIA	$115.47	7.70	116
LAKE SUPERIOR DISTRICT POWER CO.	ASHLAND	WISCONSIN	$93.18	6.21	171
MADISON GAS & ELECTRIC CO.	MADISON	WISCONSIN	$115.85	7.72	113
NORTHERN STATES POWER CO.	LA CROSSE	WISCONSIN	$91.61	6.11	173
SUPERIOR WATER,LIGHT & POWER CO.	SUPERIOR	WISCONSIN	$104.20	6.95	148
WISCONSIN ELECTRIC POWER CO.	MILWAUKEE	WISCONSIN	$109.68	7.31	135
WISCONSIN POWER & LIGHT CO.	JANESVILLE	WISCONSIN	$102.15	6.81	152
WISCONSIN PUBLIC SERVICE CORP.	GREEN BAY	WISCONSIN	$101.30	6.75	154
CHEYENNE LIGHT FUEL & POWER CO.	CHEYENNE	WYOMING	$76.77	5.12	187
PACIFIC POWER & LIGHT CO.	CASPER	WYOMING	$75.84	5.06	188
UTAH POWER & LIGHT CO.	EVANSTON	WYOMING	$126.57	8.44	77

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